

# THE IRON AGE

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## Stop, Look, Listen and Act

**J**UST as the red figures of 1932 of steel companies began their parade, steel prices collapsed as completely and quickly as though they were built on sand. This situation cannot be accepted with equanimity. It calls for action to save the industry from self-destruction.

Today's losses are due to low operating rates and low prices. Most companies had set their houses in order, on the basis of the previous prices, so as to break even when demand would produce volumes of 35 to 40 per cent. At today's prices, however, a profit at either of those quotas would be impossible.

The industry now wallows in a price morass of its own making and apparently lacks the intelligence and courage with which to get itself out. One mill thinks it can take away another's customer by offering a tempting price bait; its competitor, doubly anxious to retain what tonnage it is getting, rushes to meet the price. The buyer adds to the demoralization by shrewdly playing one against the other.

What price tonnage? What price the retention of a customer? Our answer is that a company should exert every effort within reason to keep hold of the regular and important users of its products, and in some few cases may be justified in going to extreme limits. We contend, however, that the bounds of reason have been passed when the entering of orders promises the seller nothing but continually accelerating losses. That is the situation today.

The steel industry is deliberately heading toward destruction and it is time that a halt be called before it is too late. If the present course is not arrested, steel consumers as well as producers will be the losers.

Quick, decisive action is necessary in the present emergency. The only way to secure such action is to go directly to the top. We therefore are addressing this message to the leading executives of the steel industry:

"Within your company your word is law. By passing down to your sales department the ruling that no orders are to be taken at less than a certain price, you can immediately and effectively stop the present demoralizing trend. You can abruptly end a movement beneficial to no one, a movement which is rapidly depleting the already weakened resources of your company and which eventually will mean further reductions in salaries and wages and purchasing power without adding a ton to the total consumption of steel.

"Above everything else, the times demand courage and forthright action. It is time for you to demonstrate the fact that the country's most important basic industry is capable of setting its own house in order."

# ▲ ▲ ▲ What the Machine Has Done

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**T**HIS is the second article in Mr. Giele's series on the trend of mechanization and its relation to employment. The introductory article, published in *THE IRON AGE* of Feb. 2, outlined the background of principal events from 1849 to 1929, which have had direct influence upon economic changes.

In this article the author analyzes the trend of population and its shifting occupational divisions, in order to arrive at a base for determining normal employment and thus for correctly appraising unemployment. He finds and shows us that the mechanization of the manufacturing industries has played a major part in reabsorbing men disemployed in other industries.

A careful study of the factual material comprising this unique series will provide us with the safest and surest means of appraising the effects of mechanization and for the analysis of the probabilities and possibilities in our own industry.

▼ ▼ ▼

## Employment and Wages, 1849-1929

**T**HE Population with Respect to Occupation—The influence which mechanization in the manufacturing industries has exerted on employment can be appraised only after having taken a broad view of the entire population and a consideration of its growth, its changing composition, and its occupation in all of its various pursuits. Chart 2 shows on line (a) the growth of the entire population showing very clearly how the total population has been increasing at a rate which is becoming slower and slower. In other words, we are approaching a condition where we may expect no further increase in population.

This condition will have an important bearing on employment in an indirect way as consumer markets will then no longer expand by numbers alone and can be expanded only by replacements or by creating the desire for new kinds of goods.

One factor which controls the activities of the entire population, regardless of sex, social, or economic status, is that of age. Dr. Louis Dublin of the Metropolitan Life Insurance Company has recently pointed out the significant changes which are taking place in the age distribution of our population. Doctor Dublin's investigations were directed at questions other than employment. Doctor Dublin has prepared one chart in which he has divided the entire population into three groups, namely: under twenty years of age, twenty to fifty years of age, and fifty years and older. A portion of his data has been replotted and shown in dotted

lines on chart 3 for comparative purposes.

Doctor Dublin has pointed out that, by reason of the very large reduction in infant mortality and childhood diseases, more of the children born survive into the later age groups. Beyond this point the general advance in medical science has reduced the death rate throughout middle life. In addition, the reduction in child labor, the shortening in the hours of labor, and the amelioration of both living conditions and working conditions have contributed to the prolongation of life. Recent changes in the distribution of the age groups have been of sufficient extent to materially change the composition of the typical family group as well as of the working population. Looking back only a generation or two, there are now fewer small children in the average family to be cared for and supported and, on the other hand, more potential bread-winners per family in a position to share the burden.

### Decline in Child Portion of Population

The chart shows a very considerable decline in the proportion of children under five years of age, too young either to work or go to school, and therefore, for the purpose of this analysis, entering none of the occupational groups. The group five to ten years of age is also decreasing rapidly in proportion to the entire population. This group is now normally at school and thus occupied. The group ten to fifteen years of

age is also declining in proportion to the total population. This group formerly contributed large numbers to those engaged in gainful occupation. Surprising as it may seem in these days of child labor laws and of compulsory education, some 400,000 children of this age group were enumerated as engaged in gainful occupation in the census of 1930. The proportion of this age group so occupied is rapidly declining. Several causes have contributed to this decline; the smaller number of children per family, to which reference has already been made is one; relief of economic strain on the family is another; general cultural advance or the progress of civilization is a third. Probably as important as any of these causes is the advance of mechanization in the industries, such as, for instance, in the shoe factories and cotton mills in which these children were employed in such large numbers. Thanks to mechanization production costs can now be kept down by means other than the payment of pitiful wages to small children. Supplementary charts 4 and 5 showing respectively school attendance and illiteracy throw valuable sidelights on this phase of the employment situation.

The largest single group, those fifteen to sixty-five years of age, is growing in numbers and growing also in proportion to the total population. This is the group which furnishes practically all of those engaged in useful occupations. Those sixty-five and over are also gaining in numbers and in proportion as more and more survive into this age group. With the advance of medical science a constantly larger proportion of this group remains in good health and well

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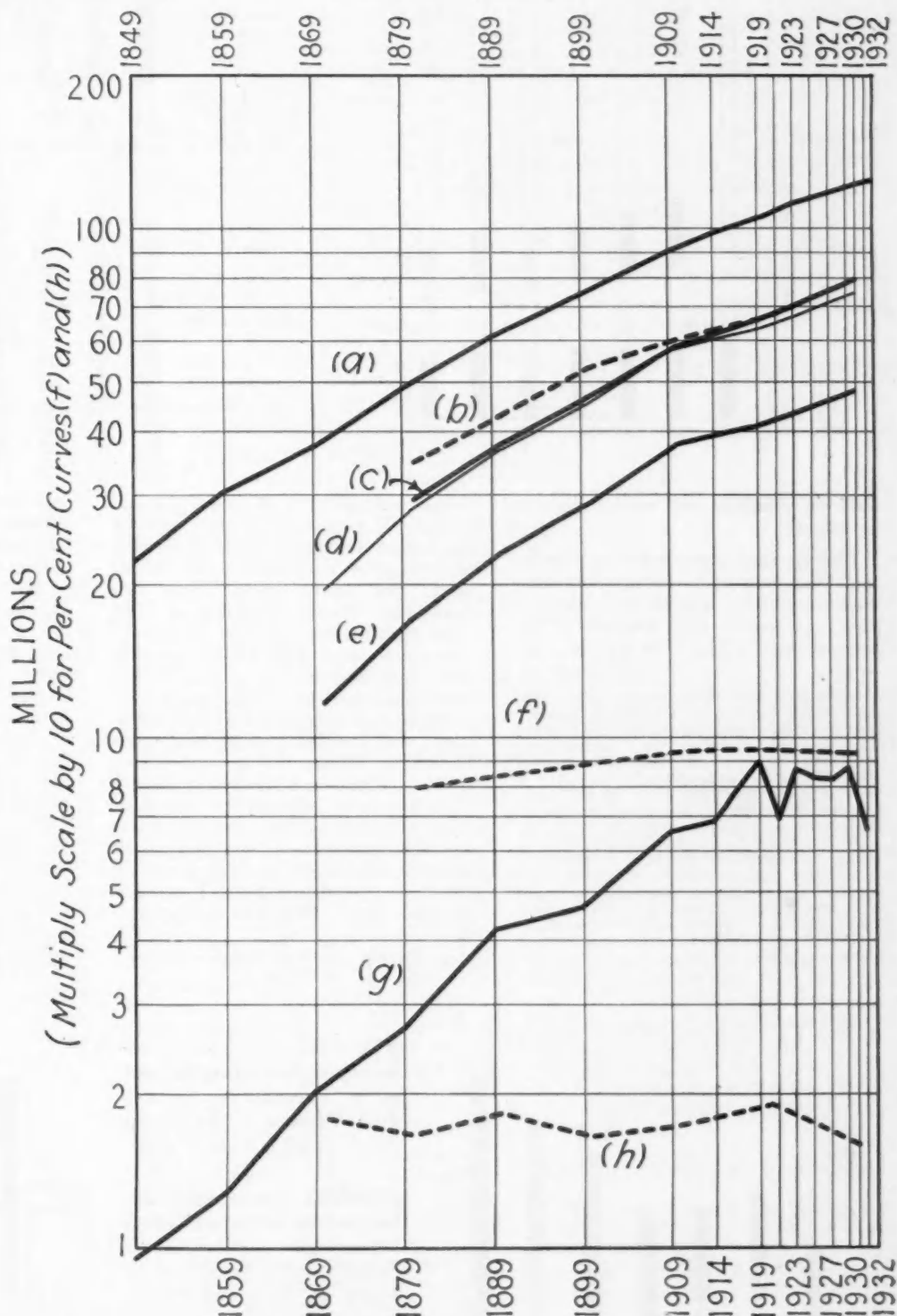
By WALTER S. GIELE

**CHART 2—The Growth of Total Population and its Distribution as to Age and Occupation**

- (a)—Total population.
- (b)—Portion from 15 to 65 years old, plus part of group 10 to 15 years of age estimated as employable at given periods. (1880, all; 1890, 75 per cent of 10 to 15 year group; 1900, 50 per cent of group, 1910, 25 per cent).
- (c)—Portion from 15 to 65 years only.
- (d)—Total in gainful occupations, plus housewives; i.e., total in useful occupations.
- (e)—Total in gainful occupations.
- (f)—Total in useful occupations divided by total available for useful occupations, i.e., degree of employment or occupational saturation.
- (g)—Total wage earners in manufacturing industries (does not include salaried group).
- (h)—Total wage earners in manufacturing industries divided by total in gainful occupations, i.e., relative degree of employment in manufacturing.

**SOURCES OF DATA FOR CHART 2**

- A (Total Population.) Statistical Abstract of the United States, U. S. Dep't of Commerce, Bureau of Foreign and Domestic Commerce, 1932 edition, p. 3.
- B (Age Groups.) The same, p. 5; also XIII Census Vol. I, p. 306.
- C Same as B.
- D (Housewives.) From the Census—reported in "Recent Social Trends in the United States," Vol. I, p. 274.
- E (Total in Gainful Occupations.) "Statistical Abstract, 1932," p. 50.
- F Computed.
- G (Wage Earners in Mfg. Industry.) "Statistical Abstract, 1932," p. 730.
- H Computed.



**DATA USED FOR CONSTRUCTING CHART 2**  
In Thousands (Except Per Cents)

	1849	1859	1869	1879	1889	1899	1909	1919	1929	1932
A	23,260	31,503	36,655	50,262	63,056	76,129	82,691	90,691	105,003	121,526
B {										
10 to 15 yrs. old				5,715	7,034	8,080	9,107	10,641	12,005	12,319
B {										
15 to 65 yrs. old				29,429	38,234	46,831	58,774	67,454	80,321	88,321
C										
See B.										
D										
Housewives		19,684	28,399	37,001	45,517	57,728	64,521	75,070	80,321	88,321
E {										
Gainful Occup.		11,876	17,392	23,318	29,073	38,167	41,614	48,830	58,350	65,122
F										
957		1,311	2,054	2,733	4,252	4,713	5,468	6,615	8,350	8,836
G										
18.1%		16.7%	18.6%	16.7%	17.5%	19.2%	15.8%	15.8%	15.8%	15.8%



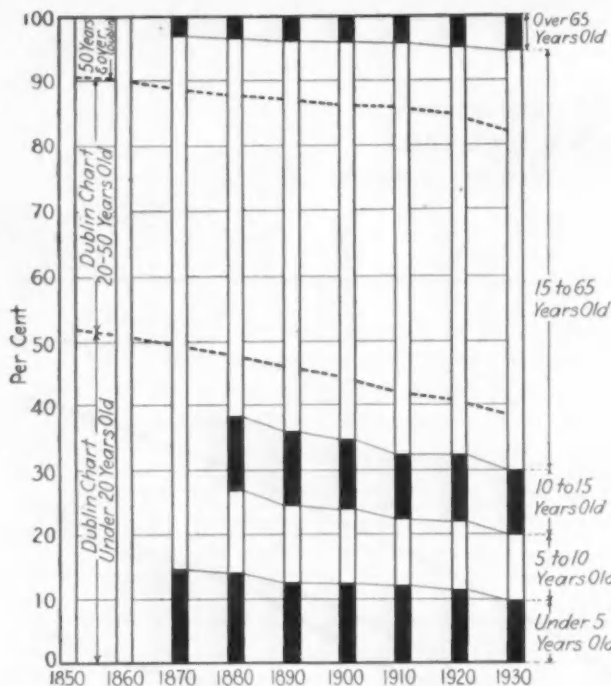


CHART 3—The Changing Distribution of the Total Population with Respect to Age

TABLE CHART NO. 3

	1850	1860	1870	1880	1890	1900	1910	1920	1930
Ages 50 yrs. and over.	8.9	9.4	10.8	11.8	12.7	13.5	14.0	15.4	17.8
Ages 20 to 50 yrs. . .	38.6	39.3	39.4	40.0	41.2	42.2	43.9	43.9	43.9
Ages under 20 yrs. . .	52.5	51.2	49.7	48.1	46.0	44.3	42.0	40.7	38.3
Under 5 yrs. old . . . . .	14.3	13.8	12.2	12.1	11.6	10.9	9.3	10.9	9.3
10 to 15 yrs. old . . . . .	11.4	11.2	10.6	9.9	10.1	9.8	9.8	10.1	9.8
Under 15 yrs. old . . . . .	38.1	35.5	34.4	32.1	31.8	29.4	29.4	31.8	29.4
15 to 65 yrs. old . . . . .	58.5	60.8	61.5	63.7	63.5	65.2	65.2	63.5	65.2
65 yrs. old and older. . . . .	3.0	3.4	3.7	4.1	4.2	4.7	5.4	5.4	5.4

Source—Dr. Louis I. Dublin, Metropolitan Life Insurance Co.

Source—Computed from data used in Chart No. 2.

able to continue its useful service to society.

Having thus surveyed the population with respect to its age, we may well proceed to analyze the employable age group with respect to its occupations.<sup>1</sup> The Bureau of the

<sup>1</sup> The following note, quoted from "Recent Social Trends in the United States," applies with as much force to the present discussion as to the one for which it was originally written, "The available census data are quite inadequate for deriving a precise activity distribution. In the present use of materials, the object has been, by means of detailed comparison of the data published for each census period, to obtain presumptive trends. However, it is believed that the figures used are sufficiently comparable to measure the broad and unmistakable tendencies which have taken place. It is the task of this chapter to sketch briefly the bold contours of these changes."

Census enumerates as gainfully occupied, all persons who are working for others for pay and persons who are engaged in business for themselves for profit. Some time ago John Van Deventer, Editor of THE IRON AGE, pointed out that in any social order some part of the population must stay at home, keep house, raise the children, care for the ill, etc., and that this constituted a necessary and useful occupation, even though no money entered the transaction. Those so occupied were not enumerated by the census as gainfully occupied. The present writer has also pointed out that this is an important occupation and probably the most important for all married women. The President's Research Committee in its report, "Recent Social Trends in the United States,"

just published, has taken account of persons enumerated by the census as "Housewives" not classified by the census as gainfully occupied, and has added these to the persons enumerated as gainfully occupied, thus creating a new and larger group which may perhaps be designated as "Usefully Occupied." "Recent Social Trends," p. 308, says, "The economic importance of the housewife's work is suggested by the number of commercial enterprises which have now attempted to compete with her in satisfying the family needs."

The occupation of children, ten to fifteen years of age, has always depended so largely on the size and economic condition of the families including these children, as well as their environment, that no exact computation of the numbers of such chil-

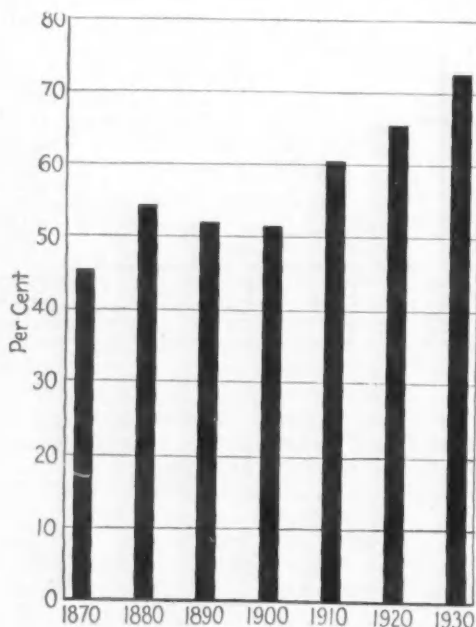


CHART 4—At left. Persons Attending School as a Percentage of the Total Persons in the Group of 5 to 20 Years of Age

CHART 5—At right. Illiterate Persons as a Percentage of the Total Persons in the Group of 10 Years of Age and Older

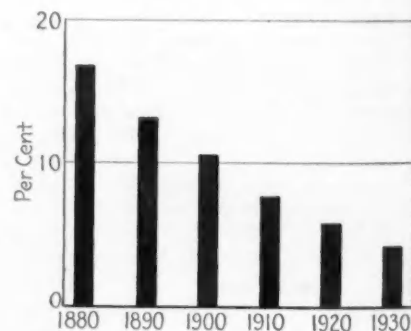


TABLE FOR SUPPLEMENTARY CHART NO. 4

Persons Attending School—as a Percentage of the Total Persons in the Group 5 Years to 20 Years of Age

1870	1880	1890	1900	1910	1920	1930
45.5	54.3	52.0	51.5	60.5	65.5	72.6

Source—"Social Trends," p. 305, Table 9.

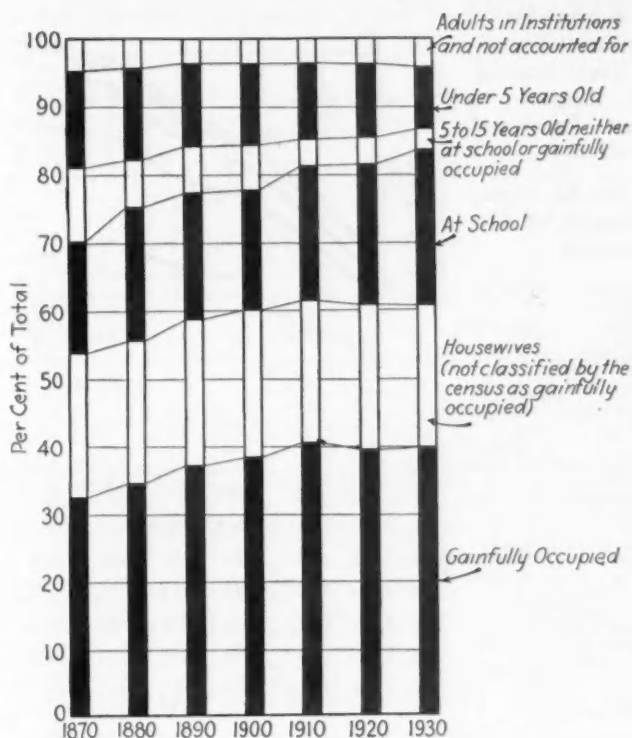
TABLE FOR SUPPLEMENTARY CHART NO. 5

Illiterate Persons—as a Percentage of the Total Persons in the Group 10 Years of Age and Older

1880	1890	1900	1910	1920	1930
16.9	13.2	10.6	7.7	5.9	4.3

Source—Bureau of the Census.





**CHART 6—The changing Distribution of the Total Population as to Occupation**

dren available for occupation can be made.

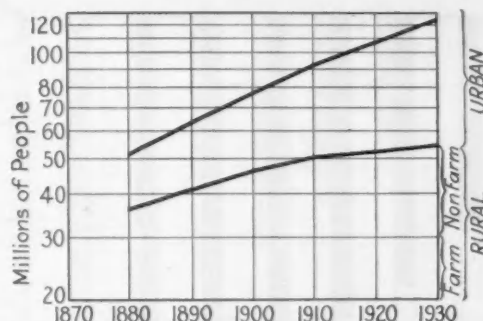
#### Children in Industry

In the light of the reference already made to the collateral evidence offered by the growth of child labor legislation, of compulsory education, and the reduction of illiteracy, an allowance for the possible (not probable) occupations of such children has been made on the basis of including for 1880 all of the children of this age group, for 1890 three-quarters of them, for 1900 one-half of them, and for 1910 one-quarter of them. For 1920 and subsequent census years, none of this age group has been included as available for occupation. As about 400,000 of them were still so occupied in 1930, it would seem that this apportionment is well on the conservative side. The additions of these numbers to the occupiable group are indicated by a dash line on chart 2 [line (b)].

We now come to the numbers of persons in the various census years, who were enumerated as gainfully occupied and the additional number of housewives not classified as gainfully occupied, giving us a total for each census year of persons usefully occupied to be compared with the respective number of persons who might be so occupied in those years. This leads, by a simple process of division, to a calculation of the percentage of all persons in the total population who might be usefully oc-

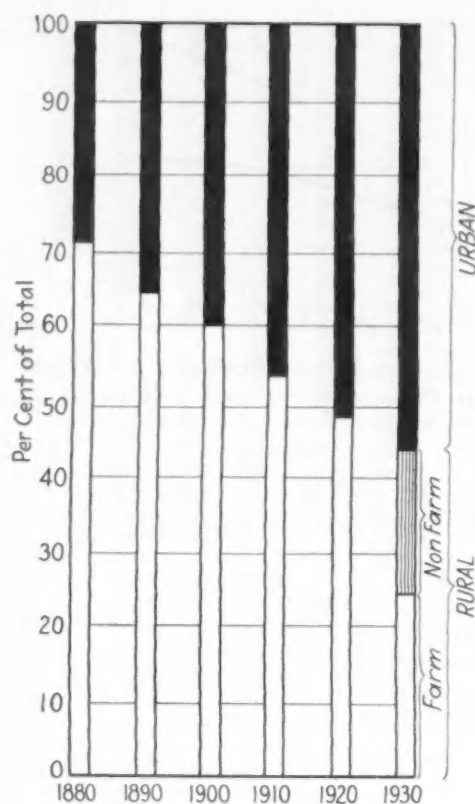
cupied who are actually so occupied. The line so plotted shows a steady increase from about 81 per cent in 1880 to 95.5 per cent in 1920, which presumably is about the maximum possible occupation, as there must always be some of those rated as occupiable, who are voluntarily idle, mentally or physically too ill to work, or for other reasons not seeking occupation.

The percentage had fallen to 93.8 in the census of 1930, an amount of recession too small to be perceptible on the chart. This decrease of a little more than 1.5 per cent may have been influenced by the depression which was getting under way in 1930 and, on the other hand, may merely be within the range of normal variation. Turning now to chart 6 we may pass from the total numbers occupied to the consideration of the changing distribution of the population with respect to its occupations. Those gainfully occupied and the additional number designated as usefully occupied, here again show the same increases already pointed out. The most noticeable change in distribution, however, is in the rapid reduction of those five to fifteen years old, neither at school nor gainfully occupied, and in the increase in those at school, particularly in the decade from 1920 to 1930, indicating that our young people and their parents are aroused to the fact that the occupations of the future will require better preparation than did the occupations of the past.



**CHART 7—The Relative Growth of Rural and Urban Populations. (Rural divided as to farm and non-farm for 1930 only)**

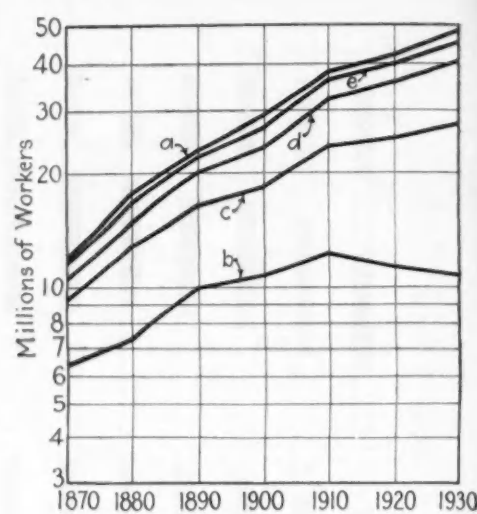
		IN THOUSANDS					
		1880	1890	1900	1910	1920	1930
Urban		14,358	22,229	30,380	42,166	54,305	68,955
Rural	{Non Farm	35,798	40,649	45,614	49,806	51,406	23,515
	{Farm						30,305
		<hr/>					
		53,820					



**CHART 8—At left.**  
The Relative Distribution of Total Population with Respect to Environment (Farm and non-farm)

**CHART 9—At right.**  
The Growth of Occupations

a=Total gainfully occupied  
b=Gainfully occupied in agriculture, lumbering and fishing  
c=(b)+gainfully occupied in manufacturing and mining  
d=(b and c)+gainfully occupied in trade, transportation and clerical  
e=(b, c and d)+gainfully occupied in domestic and personal service  
e to a=Professional service



IN THOUSANDS							
The number of persons gainfully occupied in..	1870	1880	1890	1900	1910	1920	1930
Agriculture, lumbering and fishing.....	6,428	8,596	10,027	10,889	12,459	11,393	10,752
Manufacturing, mechanical pursuits and mining.....	2,846	4,449	6,481	7,451	11,700	13,809	16,809
Trade, transportation and clerical work.....	1,383	2,122	3,797	5,444	8,373	10,383	13,034
Personal and domestic service .....	1,168	1,622	2,133	3,076	3,871	4,157	4,812
Professional service.....	338	603	880	1,213	1,764	2,112	3,426
Total .....	12,163	17,392	23,318	29,073	38,167	41,854	48,833

Source—"Statistical Abstract, 1931," p. 63; "Recent Social Trends," Vol. I, p. 274 and p. 281.

IN PER CENT							
Urban .....	28.6	35.4	40.0	45.8	51.4	56.2	
Rural.. { Non Farm {	71.4	64.6	60.0	54.2	48.6	43.9	
Farm      {							19.3
							24.6

Source—Computed from Data Chart 7.

without involving any essential change in the rural character of its population.

With the total number engaged in gainful occupation established, we may now consider the growth of the various broad classes into which these gainful occupations may be divided. The classifications of the census make it convenient to sub-divide the gainful occupations into: 1, The group including agriculture, lumbering and fishing; 2, The group including manufacturing, mechanical pursuits and mining; 3, The group including trade, transportation, and clerical work; 4, The group including domestic and personal service; and 5, Professional service.

Inspection of chart 9 emphasizes that all the sub-divisions of gainful occupations showed substantial rates of growth up to the census of 1910, from which time the numbers of those engaged in agriculture alone show a decline, while the remaining sub-divisions continued their growth.

#### Absorption of Displaced Workers

Supplemental chart 10, however, shows in much more striking fashion how rapidly the distribution of those gainfully occupied has changed with respect to the various occupations and especially how disemployment in some occupations has been absorbed by growing employment in others.

It is particularly interesting to notice how the technological advance involved in the mechanization of all kinds of industry has increased the proportion of those in the professional service group. The largest increase is in the group comprising

transportation, trade, and clerical work. These are the people that move the materials from one industry to another and finally to the consumer. They are the buyers and the sellers of the products of other industries and they care for the records and handle the financial phases of the transactions.

Those engaged in manufacturing, mechanical pursuits and mining also have shown at each census a gain in numbers as well as a gain in proportion of all of those engaged in gainful occupation. Although agriculture, lumbering and fishing showed a gain in numbers up to the census of 1910, it has shown a steady loss in proportions to the total number engaged in gainful occupations throughout the period from the census of 1870 to the census of 1930.

Reverting to chart 2 there is shown a line (g) representing the wage-earners in manufacturing industry to develop the part that the manufacturing industry has played in total employment. This curve shows wage-earners only and does not include the considerable number engaged also in manufacturing industry compensated otherwise than by wages. Computing the percentage of those employed as wage-earners in manufacturing industry as a part of all of those engaged in gainful occupations, we find that the highest percentage occurred in 1920 at 19.2 per cent and the lowest in 1930 at 15.8 per cent

(chart 2, line h). This relative decline is due to the increase in the classification of transportation, trade and clerical, during the decade between those years. This does not, however, tell the whole story, because substantially the whole expansion in the classification of transportation, trade and clerical service has been brought about by the mechanization in the mechanical industries. To cite a single illustration, the entire automobile industry could never have been developed without the very highest known development of mechanization and it is possible that no industry contributes so much, directly and indirectly, to employment in transportation trade and clerical services as does the automobile industry.<sup>2</sup>

<sup>2</sup> Quotation from "Recent Social Trends in the United States," from volume 1, page 286. "The clerical and selling occupations have expanded rapidly with the refinement and elaboration of the processes of commerce and trade. We have seen that between 1870 and 1920 those at work in agriculture fell in relative numbers from over half to a little more than 25 per cent of the total working population and those in manufacturing and mechanical operations increased from 22 per cent to 30 per cent. In 1870 a scant 10 per cent of the working population was sufficient for the distribution of the combined product of the 1½ per cent who were engaged in mining, the 22 per cent in manufacturing and the 52 per cent in agriculture. But in 1930 the diversity of industrial production and the area of markets were so vastly extended that more than one-fifth of the nation's workers sought a livelihood in transportation and distribution of the nation's output. Thus those engaged in trade, transportation and communication had more than doubled in their relative num-



bers in the occupied population from 1870 to 1930.

"The occupations of trade fall naturally into two main subdivisions—the commercial and financial employment. The commercial group comprising the commercial travelers, the wholesale and retail dealers, and the sales people, is responsible for marketing the products of industry. In 1880 and 1890 persons in these occupations were only one-fifth as numerous as those in the manufacturing and mechanical groups. From 1900 to 1920 there were about one-fourth as many and in 1930 one-third as many in trade as in the manufacturing and mechanical occupations.

"If the real estate dealers are included with bankers, brokers and insurance agents, the ranks of the financial groups expanded even more rapidly than those of the retail and wholesale dealers and about as rapidly as the number of sales people and stock clerks.

"The expansion of the clerical group, which is scattered widely among the fields of finance, industry and trade, has taken place in spite of the rapid introduction of labor-saving office machinery.

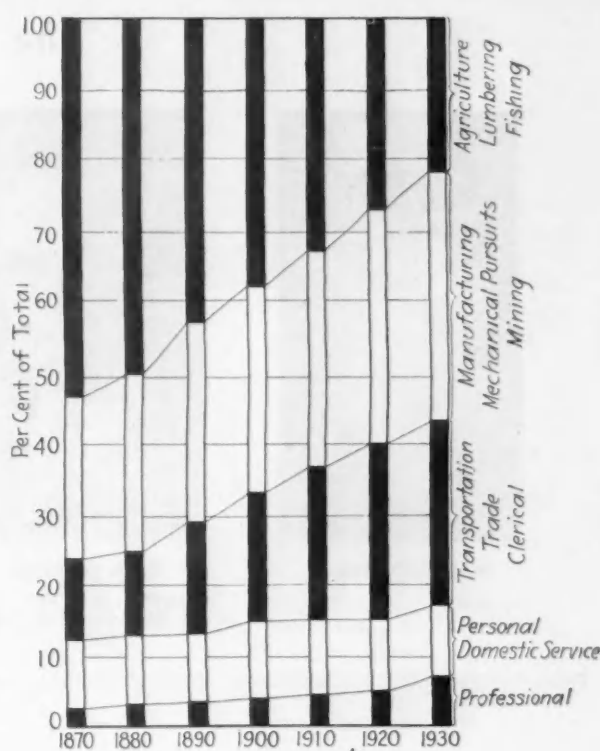
"If clerical workers are combined with those in trade and transportation, it is found that this composite group has almost trebled in relative numerical importance over the seventy-year period."

(Page 290—footnote 19)—"This estimate was made primarily to determine the probable trend of governmental employment, rather than the precise number employed. An independent estimate of the growth of the public service occupations from 1910 to 1930 has been made in connection with this study. An estimate of public payroll including more than a million and a half persons in 1910 had increased to about two and three-quarter millions in 1930.

"It is estimated that approximately two hundred thousand clerical workers were in the public service in 1930 as compared with seventy-four thousand in 1910. The growth of employment in public service has a significance far beyond its numbers. At one extreme the growing importance of public boards, bureaus and commissions is responsible for the conduct of highly important constructive and essential scientific and investigative work. At the other extreme political opportunists furnish the basis for local, state and federal machine politics frequently with too little reference to the best service to the public interest. The growing ranks of the permanent civil service commonly enjoy an unusual security and a continuity of employment during the vicissitudes of private business."

The two classifications of personal and domestic service and professional service being relatively small could have but relatively little effect on total employment. It therefore appears that the tremendous relative lack of growth in employment in the great agricultural industry was absorbed almost entirely by the groups of manufacturing and transportation, trade and clerical. Reverting again to the spectacular automobile industry for illustration, it is a well-known

**CHART 10 — The Changing Distribution of Occupations Showing Per Cent of Total Gainfully Occupied in Each of the Occupational Groups**



	IN PER CENT						
	1870	1880	1890	1900	1910	1920	1930
Agriculture, lumbering and fishing	52.8	49.4	42.9	37.4	32.6	27.2	22.0
Manufacturing, mechanical pursuits and mining	23.5	25.6	27.8	29.1	30.7	33.1	34.5
Transportation, trade and clerical work	11.4	12.2	16.3	18.7	21.9	24.8	26.7
Personal and domestic service	9.6	9.3	9.2	10.6	10.2	9.9	9.8
Professional service	2.7	3.5	3.8	4.2	4.6	5.0	7.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source—Computed from Data of Chart 9.

fact that a very large proportion of the many thousands of men who find employment, not only in the automobile factories themselves, but in all of the countless subsidiary industries that serve it, a large proportion has been recruited from the farms of the middle west. So it appears that much as has been said about disemployment resulting from the mechanization of the manufacturing industries, a very much greater measure of disemployment has taken place in the ancient and conservative agricultural industry. The reaper and the binder,

the gasoline motor and electric power on the farm; improved technique with respect to soil fertility and cattle breeding, seem in their own field to have far outdistanced the automatic screw machine, the Bessemer process and high-speed steel in scrapping men.

So far as throwing men out of employment is concerned, it would appear that the mechanization of the mechanical industries has played a major part in reabsorbing men disemployed in other industries.

## British Report Issued On Heterogeneity of Steel

The Iron and Steel Institute of Great Britain, 28 Victoria Street, London, S. W. 1, has published the fourth report on the "Heterogeneity of Steel Ingots," which embodies the results of the work done during the past three years by the joint committee of the Iron and Steel Institute and the National Federation of Iron and Steel Manufacturers with the assistance and support of the Iron and Steel Industrial Research Council of Great Britain. Details of a study of 27 ingots are presented, the whole

work being divided into the following:

- A Further Study of Steel Ingots.
- Oxygen and Silicates in Steel.
- The Distribution of Silicates.
- Principles Involved in the Making of Rimming Steel.
- Pyrometry as Applied to Liquid Steel.
- Ingot Mold and Materials. Part I—Thermal Properties of Ingot Mold Irons. Part II—The Thermal Conductivities of Ingot Mold Irons.
- Some Further Mathematical Considerations concerning the Cooling and Freezing of Steel Ingots.
- Bibliography.

The experimental work carried out during the past three years proves that the presence of non-metallic par-

ticles and ghosts in the ingot is largely governed not only by the principles of manufacture, but also by the conditions of melting and refining in the furnace, the condition of the finishing slag at the moment of tapping and the manner of addition of the deoxidants. The program illustrates besides the effect of the temperature of the mold, the size of the nozzle, the rate of teeming and the choice of deoxidants upon the heterogeneity of the ingot, and the position is now reached at which it is possible to control with a certain degree of precision the segregation inevitably associated with even the best ingots produced in modern practice.





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THERE are two general ways of embalming iron to prevent its decomposition, which might be called, respectively, the metallic and non-metallic methods. In the non-metallic method the articles are coated with an organic substance, usually oil, or varnish, the efficiency of which depends on its being more or less airtight; when coloring matter is added to the oil it becomes a paint. The metallic method consists of coating the iron with some other metal, and it is this method which we will here discuss.

#### Zinc the Best Rust Preventive Coating

It is difficult for many persons to understand why zinc is the best rust preventive for iron and steel, and they believe it is on account of its cheapness that it is so extensively used. They have an idea that lead, being a cheaper metal, would answer far better, and as it is more non-corrosive than zinc, would protect the iron better. This is not a fact, however.

The very fact that zinc is a corrosive metal does not affect its properties when applied as a coating to iron or steel. Indeed, if it did not corrode, it would not be of value for such a purpose. When iron or steel, which has been coated with zinc, is exposed to the atmosphere, a galvanic action is set up, although, of course, extremely slight. Any two dissimilar metals form a galvanic couple, but as zinc is the most electro-positive metal, the galvanic action between the zinc and iron is as great as could be obtained when iron is used for one of the metals composing the couple.

The result is, therefore, that, with the slight galvanic action set up on galvanized iron or steel when ex-

posed to the atmosphere, a corrosion takes place. Were this not so, then there would be no protection. Zinc, however, when exposed to the air, does not corrode rapidly or deeply and, in fact, very lightly. This property is of great value, as the zinc

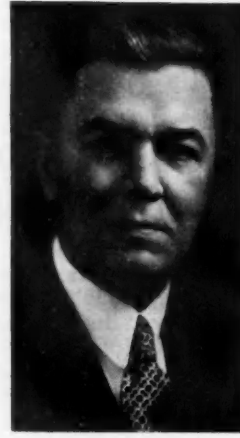
coating does not corrode rapidly, even with the galvanic action set up, so that it lasts for a far greater length of time than would naturally be expected. The very fact, however, that the zinc corrodes at the expense of the iron is all that is necessary to

## New Developments in Galvanizing

By W. H. SPOWERS, JR.



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**ALEX L. PAGE**  
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Structural Steel Co., Allen-  
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**J. T. HANLEY**  
Vice - President, American  
Wire Fence Co., Chicago,  
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## in Galvanizing



protect the iron or steel, even though  
it be extremely slight.

### Decrease of Zinc Coating Cause of Short Life

Many galvanized commodities dur-  
ing recent years have not given that  
same high character of durable ser-

**T**HERE are five major developments of importance which have influ-  
enced greatly the quality as well as the cost of galvanized products in  
the past year, according to the author, who is a consulting engineer in  
New York, specializing in this field. Among these developments are the  
perfection of a neutral flux to reduce dross formation, the preparation  
of a special flux, and a continuous process for galvanizing wire. Applica-  
tion of the diffusion flame for heating galvanizing kettles is discussed.  
Three developments under way are: perfection of an automatic wipe for  
galvanizing wire, a more permanent container for zinc, and a bright coat  
on galvanized products.



vice which was earlier responsible for  
their excellent reputation and which  
resulted in a large tonnage consump-

tion. The decrease of zinc used to  
furnish the protective coatings is  
justly given as the reason for the  
short life of these materials. The  
thinner the zinc coating the shorter  
the life of the finished article.

Every executive, engineer, archi-  
tect, builder and purchasing agent  
should be vitally interested from an  
economic standpoint in this matter.  
There can be no reasonable excuse  
these days for the purchase or appli-  
cation of galvanized roofing or siding  
having an average life of only about  
three years, when, for a small per  
square foot additional cost, sheeting  
and roofing can be obtained which  
will last many times as long. This  
incorrect use of thin coated stock has  
done much to produce erroneous im-  
pressions as to the real merit of gal-  
vanizing.

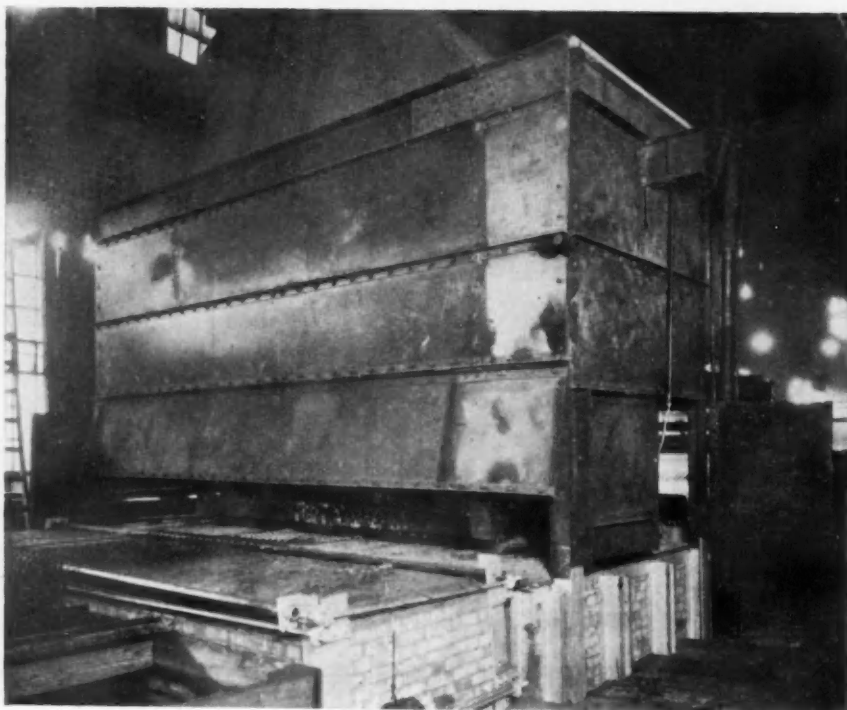
In the manufacture of galvanized  
products the application of the maxi-  
mum amount of zinc consistent with  
the practical possibility of its manu-  
facture should be striven for, if these  
products are expected to render long  
service on exposure. Physical con-  
siderations only should be the lim-  
iting factors in deciding the amount  
of spelter per unit area.



**C. C. WICKWIRE**  
President, Wickwire  
Brothers, Cortland, N. Y.



**W. C. SUTHERLAND**  
Vice - President, Pittsburgh  
Steel Co., Pittsburgh, Pa.



Combination fuel setting at Wickwire-Spencer Steel Co., Buffalo, N. Y.

To those individuals who have recognized the desirability of producing a fine quality of merchandise and of marketing only such products as will speak well for themselves, great credit is due. These progressive men have undertaken, often at great expense, developments based many times only on hope of successful result but of course on engineering experience. In every case, where sound constructive cooperation has existed, success has been attained.

#### Development of Neutral Fluxes

**T**HERE are five of these developments of major importance and of recent date which have had great influence not only on the quality of the

merchandise but on the cost of production, the first being the use of neutral fluxes.

Those of us who are concerned with this process have realized for a long time that one of its bug-bears, seemingly necessary, has been the formation of dross. We know that dross is formed because the zinc absorbs iron and that a small percentage of iron would contaminate large percentages of zinc. This contamination came from four sources: first, from the work itself; second, from the sides of the kettle; third, from boiling dross; and fourth, from the use of active fluxes.

The writer decided to attack these problems individually and first to ap-

proach the active acid situation. We knew that by the use of active fluxes, such as muriatic, the situation was acute. We first cleaned the scale from the work by either sulphuric or muriatic acid; then used the water wash; then we brought this clean material to a bath of muriatic. The muriatic was used on the theory that the clean condition of the work must be maintained until its immersion in the zinc and that the best protection for this was a flux wash but, in the use of muriatic acid which is in itself a very active agent, we presented work to the bath coated with a heavy layer of iron salts which were very soluble in zinc. The problem, therefore, was to protect the clean work as it came from the water wash but not to attach to it this heavy layer of iron salts. After much experimental work with various types of materials, a neutral flux of zinc chloride with proper acidulation seemed to be the answer.

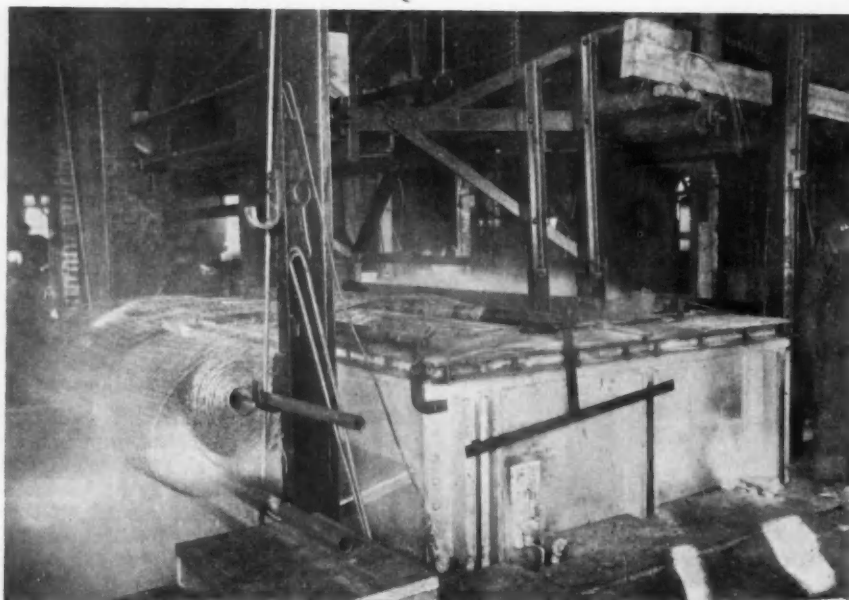
#### Reduction of Dross Formation

About this time the writer was called to a large range boiler plant in Tennessee because of what seemed to be an excessive dross accumulation in their operation. The muriatic tank was emptied and filled with the proper concentration of zinc chloride, properly acidulated, the sal ammoniac was dispensed with and the proper grade of zinc ammonium chloride substituted. The dross in this plant was immediately cut in half. This was the first practical application of the neutral flux technique. Today every progressive galvanizing plant in the country uses this technique, except those, of course, who are using No. 20 flux, a more recent advance about which I shall speak later.

#### Eliminating Under-Fired Shallow Pans

The next attack made upon the dross accumulation—that of boiling dross—was then subjected to laboratory experiments. We found that agitation of dross, caused by bottom firing or too low firing of the kettle, produced excessive quantities of dross. Methods were then devised so that the great proportion of the input of heat on the kettle went through a higher area of the bath than was the custom. Changes were then made in a wire plant located in Canada. The shallow underfired pan was removed and a deep reverse flange-type kettle was installed. This design was so worked out that the greatest proportion of heat input was applied to the top third of the side of the kettle and graduated toward the bottom.

We found that we then had a downward thrust of the dross, which aided of course its natural desire to settle to the bottom and eliminated the boiling situation which had existed because of the under-firing which had previously been the case. This kettle was started Jan. 8, 1931, was drossed April 18, delivering 1020 lb. of dross.



Modern setting for woven fabrics at Wickwire Brothers, Cortland, N. Y.



It was crossed the second time on May 23, delivering 860 lb. of dross. In five months 175,822 lb. of spelter was consumed with 1880 lb. of dross resulting. This was a loss of slightly over 1 per cent in five months' operation. Continuous operation of this kettle for a period now of two years has resulted in proportionately little change in this situation.

When you take a previous performance on under-fired shallow pans, producing in the neighborhood of 35 per cent dross and compare it with these figures, the saving is manifest. In this particular case, however, this plant used a fuel which is not permissible in the States and therefore as great a reduction from this angle cannot be attained. But I have seen similar changes here with gas fuel reducing dross from 30 per cent to 8 per cent—this, of course, in conjunction with the neutral flux technique.

Of course, there are other advantages resulting from this deep-fired procedure and one of the greatest is the fact that by pushing down the dross instead of boiling it up, we have a pure zinc area in which to galvanize and this means a great deal from the standpoint of bonding.

Thus we have the second step completed. First, the elimination of iron salts by the neutral flux technique and, second, the elimination of boiling dross. The third step in this procedure, then, is the elimination of the dross which is formed from the sides of the kettle to which I shall refer later in "developments in progress." The fourth step—the formation of dross from the work itself—has not been undertaken, but it is, I believe, quite possible of solution.

### Perfection of a Special Flux

THE next development which we shall review is the perfection of the No. 20 flux. We know that, in order to produce a perfect bonding in all forms of galvanizing, it is necessary to present perfectly clean work to perfectly clean zinc. The technique in regard to presenting perfectly clean work is handled by means of the neutral flux which we have been discussing but, to produce a perfectly clean surface of spelter continuously and at all times on the surface of the bath, is quite a different problem. It has been the custom for three generations of the writer's family to use for this purpose a volatile flux of sal ammoniac, but this requires constant renewal by hand and results in a disagreeable atmospheric condition in the plant and is very expensive.

May we take, for example, a pipe or tube plant which feeds its pipe into the kettle from the side. One-half of the kettle is ordinarily dammed off for the full length of the kettle and this volatile flux is built up by shoveling on the top of the spelter great quantities of sal ammoniac, which produces a black foaming froth which is more or less



Straight line technique in range boiler operation at Hedges-Walsh-Weidner Co., Chattanooga, Tenn.

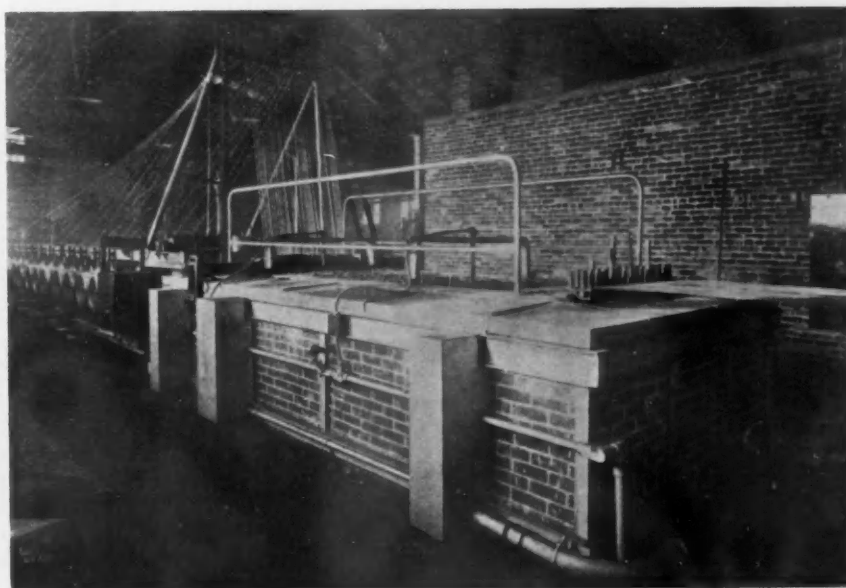
effective in blanketing the zinc upon this area of the kettle. The pipe is then rolled into the kettle through this flux, which not only prevents burning of the flux wash but presents to the work a clean kettle surface. To stand beside this operation, as I have done for years, and see the workmen shovel on this expensive material, shovelful after shovelful, is to make one's heart sink.

To eliminate this waste then and still retain the neutral flux technique was the problem. This work was put in the laboratory for solution and what was considered a satisfactory material was decided upon in December, 1931. The writer then placed the material in practical operation in three plants—and the results were

so satisfactory that it was placed upon the market for general use in March of last year. It is now selling in carloads.

### How to Use the New Flux

What is done is just this: The up-to-then highly desirable zinc chloride flux bath is emptied and the No. 20 flux, which is in itself entirely neutral, is substituted. A starting flux is built upon the kettle from crystals of No. 20. As the work feeds from the flux bath into the kettle, it carries with it sufficient No. 20 to produce the required volatile flux on the top of the kettle. The required amount of bath cover is maintained by a prescribed concentration.  
(Concluded on Advertising Page 12)



Deep fired installation at Frost Steel and Wire Co., Hamilton, Ontario

# A Recorder-Controller for Materials Test

**N**EARLY 300 years ago Galileo initiated the art of materials testing by making certain tests upon materials to determine their strength. For nearly 250 years afterward we had to be satisfied with tests on small specimens and with the erroneous assumption that the data secured were applicable by direct proportion to full-size structural members. Proof of this error has caused the construction of larger and larger machines until such proportions have been attained as those of the 2,300,000-lb. Emery and the 10,000,000-lb. Olsen at the Bureau of Standards, Washington; the 6,600,000-lb. Seifert at Grosse-Lichterfelde; the 4,000,000-lb. Southwark-Emery at the Berkeley laboratory of the University of California and the 2,800,000-lb. Avery at Dorman, Long & Co., Ltd., Middleborough.

During the past 50 years there has been continuous development in devices to record the results of such tests. In general, these devices have used no auxiliary source of power to produce the record but have depended upon the variation in length of the specimen itself and upon the motion of the poise or pendulum or other means of load measurement.

The solution of the problem of an automatic controller, in addition to the recorder, had never been approached and the problem seemed well-nigh insolvable until the recent development of the Southwark-Emery system of hydraulic load production and measurement furnished the key.

This instrument is the combination of several distinct devices associated

for this purpose for the first time. Functionally, it provides in this and alternative combinations: (1) an autographic stress-strain recorder, which produces a graph up to incipient failure, or which may, by adaptation, produce a graph to and through failure on metal, wood or any other material; (2) an instrument which is all of (1) and in addition controls load application to effect constant rate of strain increment, constant rate of load increase and load maintenance at constant value. Despite these qualities it in no way limits manual control which is inherent up to any predetermined point at which the instrument takes over the control function and proceeds to exercise it to a point elected by the operator.

Basically, this device is a combination of the extensometer, the Bourdon tube, and, the hydraulic valve in association with motors, relays, solenoids and mechanical clutches—constituting a recorder-controller which is neither complex nor difficult of adjustment or of maintenance.

The extensometer used in the Southwark-Emery stress-strain recorder-controller is fundamentally a micrometer screw in combination with a mechanical lever multiplying system. It is easily attached to the specimen, the gage length being fixed by the extensometer itself, with no separate device needed to establish gage points. After tightening two thumb screws the frame is released by a small cam lever and the extensometer is free to operate. It consists of a steel frame, flexible in the direction of the axis of the specimen, but rigid in every other

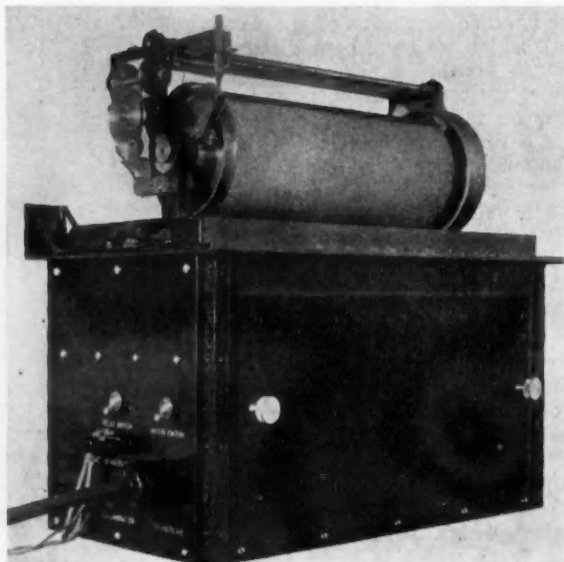
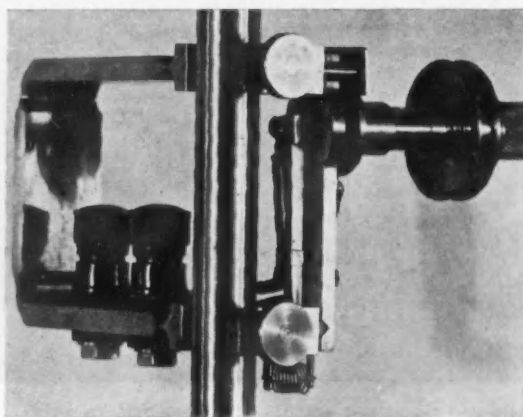
direction. The multiplying lever and micrometer screw are mounted in a plane perpendicular to that of the mounting screws. This provides automatic averaging of strain in case of unequal extension of the specimen. (It is not primarily an indicating instrument, although it is possible to use it as such.) While it measures strain, its basic function is not to reveal it directly. It is primarily a relay—a link between the varying gage length and the recording pencil. As the specimen extends (or contracts) an electrical circuit carrying a minute current is broken, the motion at the coin silver and nickel contacts being multiplied by the lever system. The recorder, using a source of power outside the extensometer, proceeds at once to reestablish the circuit by turning the micrometer screw until a new contact is made. Action at once ceases. But this effort of the recorder to reestablish a broken circuit serves as the means of moving the recorder pencil by the proper amount to record the strain variation. This motion is linear and the values along the ordinate on the graph are strain values. The sensitivity is such that 0.00002 in. strain may be made to produce a readable motion of the recording pencil while its accuracy is plus or minus 0.00005 in.

We have now established means for securing one of the two coordinates necessary to the complete stress-strain graph. Let us turn now to the other member of the instrument, which serves to record the stress.

Bourdon tube gages are by no means new or novel. All are familiar with the curved hollow tube of oval cross-

**FIG. 1 (Below)**—Through the multiplication by levers in, and by the micrometer screw of this extensometer, and by the radius of the pulley on the micrometer screw, ratios of as much as 2000 may be had.

**FIG. 2 (at Right)**—A 1/20-hp. motor provides power for recording, graphically, the variations in strain in the specimen. Recording is controlled by extensometer of Fig. 1.





# als Testing Machines

By C. H. GIBBONS

Baldwin-Southwark Corp., Philadelphia

section which when subjected to internal pressure tends to uncoil. By suitable mechanical means the motion of the free end of the hollow tube, which is rectilinear in the gages used in the Southwark-Emery recorder-controllers and testing machines, is transformed into a rotary one about an axis on which an indicating hand or a control arm is mounted. Since the motion of the free end of the tube is a function of the pressure in the tube it becomes a simple matter to cause a hand sweeping over the face of a dial to indicate pressure—or, in special cases, such as the one under consideration, to indicate load.

The earliest materials-testing machines, except the smallest, were equipped with hydraulic means for load production. Some used a lever weighing system; e.g. the famous 100-ton testing machine at the Woolwich Arsenal. Some used manometers, "valves" or Bourdon tube gages to indicate pressure in the main cylinder and thereby to approximate the load on the specimen; e.g. the chain testing machine of Brunton & Co. of about 1813 and in America the eye-bar testing machines of Union Bridge, Phoenix Bridge and American Bridge companies. Those of the latter type

were uniformly inaccurate not only because of the losses due to packing friction but also because of the absence of consistent and dependable performance of Bourdon tube gages or "valves."

But technical advances in collateral fields—notably, in metallurgy—had never stopped and by 1923 a group of men of long experience in testing machinery manufacture had the faith and the courage to attempt the design and manufacture of precision Bourdon tube gages. The results of their efforts and achievements are today incorporated in the Southwark-Emery stress-strain recorder-controller as the control element for the motion of the recorder drum which supplies the abscissa to the stress-strain graph. The guaranteed accuracy of these gages is  $\frac{1}{4}$  of one per cent of load from 10 per cent to 100 per cent capacity. Also periodic calibration over a period of years has proved that accuracy is unaffected by lapse of time.

A striking evidence of the progress which has been made is that, recently, a Southwark-Emery dial indicating instrument assembly has been installed as collateral to a lever weighing system on one of the largest

testing machines in the world. This installation was not so much to increase accuracy as to increase convenience in manipulation and in the reading of load values. This is weighty evidence of the practicality of properly designed and constructed Bourdon tube gages for precision materials-testing machine service.

In the recorder-controller a Bourdon tube, of the same design and construction as those in the indicating instruments of the Southwark-Emery testing machines, operates a light metallic arm on the end of which is a coiled nickel wire of small diameter having a short projecting straight portion, or "cat-whisker." Facing this arm is a disk mounted on a shaft whose axis is coincident with that of the arm. On the disk face is a coin silver strip whose radius is that of the cat-whisker. This strip is interrupted for a very short distance at two points. As the arm rotates under the urge of the straightening Bourdon tube, an electrical circuit is closed between the cat-whisker and one of the two annular segments of coin silver. In this circuit is a sensitive relay which, in turn, controls current through an electro-magnet which, when energized, causes a sensitive fine-tooth clutch to

FIG. 3—A simple step from the recorder is the recorder-controller shown below. This controls the rate of power input to the testing machine, providing constant load or constant rate of stress or strain increment.

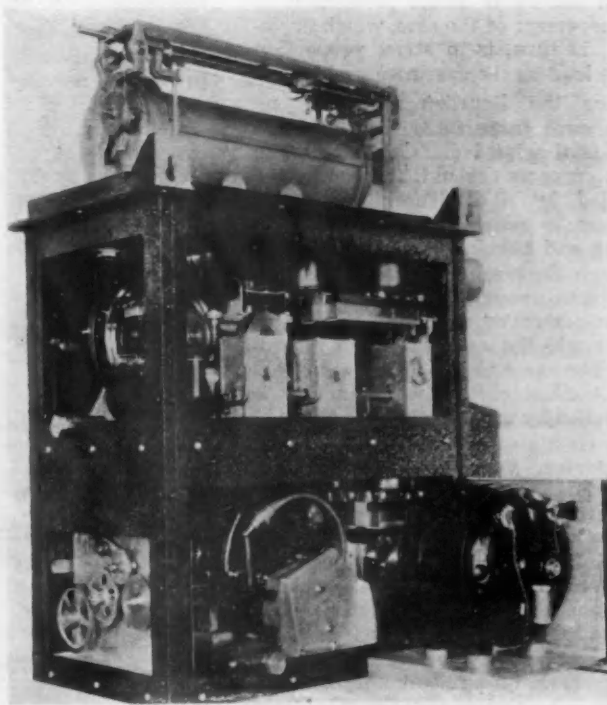
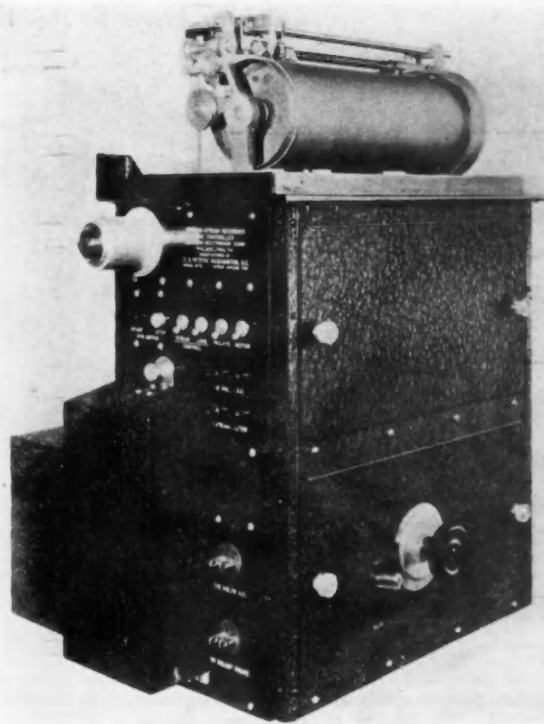


FIG. 4—The synchronous motor shown at the rear of the recorder-controller drives the auxiliary disk at various velocities.



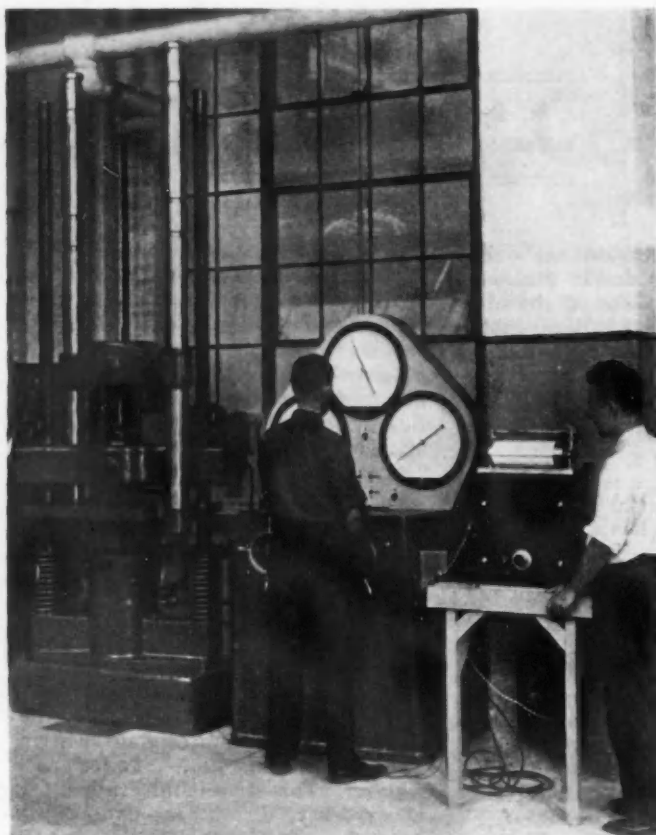


FIG. 6—Southwark recorder-controller attached to extensometer on specimen in testing machine. Courtesy National Bureau of Standards, Washington.

engage. Power from a continuously running motor serves to move the disk forward and to break the minute current of the control circuit.

The clutch immediately disengages and since the worm-and-wheel drive is self-locking there is no over-run. Attached to the mechanism actuating the disk is the drive which rotates the recording drum (which carries the graph paper) in strict proportion to the movement of the arm, which movement, in turn, is in strict proportion to the load on the specimen under test.

Thus the Bourdon tube has no more work to perform than it would have if it were indicating only. The weak currents through the contacts—shunted by a condenser and a resistance in series—are such that the arcing and burning is negligible. Yet through the mechanical and electrical interlinks power of the order of 1/20 hp. is controlled, and it is this latter power which does the work of recording. The same motor through a duplicate toothed clutch, whose action is controlled by current through the contacts (previously described) in the extensometer, provides power for the movement of the recording pencil, which also moves in strict proportion to the variation in strain. Through the multiplication by levers in and by the micrometer screw of the extensometer and by the radius of the pulley on the micrometer screw, ratios of as much as 2000 may be had. It is found, however, that a multiplication ratio of 250 to 750 provides greater all-around satisfaction for most laboratories except, possibly, those devoted to research.

All parts described in the foregoing are essentially those of the recorder alone although they also are integral parts of the recorder-controller as well.

It is a comparatively easy step from the recorder to the recorder-controller, an instrument which not only makes a record but also controls the rate of application of stress or strain at the command of the operator.

For producing constant rate of strain variation it is necessary only to provide a moving contact along the

path of the pencil travel; i.e. along an ordinate of the stress-strain graph. The velocity of this moving contact is controlled by a small synchronous motor and a group of readily changed gears. The design as now standardized offers 12 speeds; six on an inches-per-minute basis and six on an inches-per-hour basis. Or, in other words, it offers speeds from 0.0001 in. per inch gage length per hour to 0.002 in. per inch gage length per minute. The number of steps in the range, however, may be indefinitely extended by the multiplication of sets of change gears. Provision is made for all testing speeds up to the maxima recommended by the A.S.T.M. For speeds higher than these, special provision is necessary in order that there be no lag of the recording pencil.

The synchronous-motor-controlled moving contact serves as a control for a solenoid-operated hydraulic valve, which admits more or less fluid to the load-producing cylinder of the testing machine. In this way the strain in the specimen (which means movement of the ram in the load-producing cylinder) is controlled as to time-rate by the quantity of fluid admitted to the cylinder from the pressure supply.

In the same manner an auxiliary disk of the same type as that described for the recorder is driven by a synchronous motor at various velocities. Contacts of the same type as those previously described serve to control, through the valve, the quantity of fluid admitted to the cylinder and, therefore, the time-rate of stress application. Speeds of stress application up to one-half the capacity of the testing machine per minute are available.

It is obvious in both rate-of-strain and rate-of-stress control that slippage of the specimen in the grips, of the grips in the heads of the testing machine, and strain outside the gage  
(Concluded on Advertising Page 10)

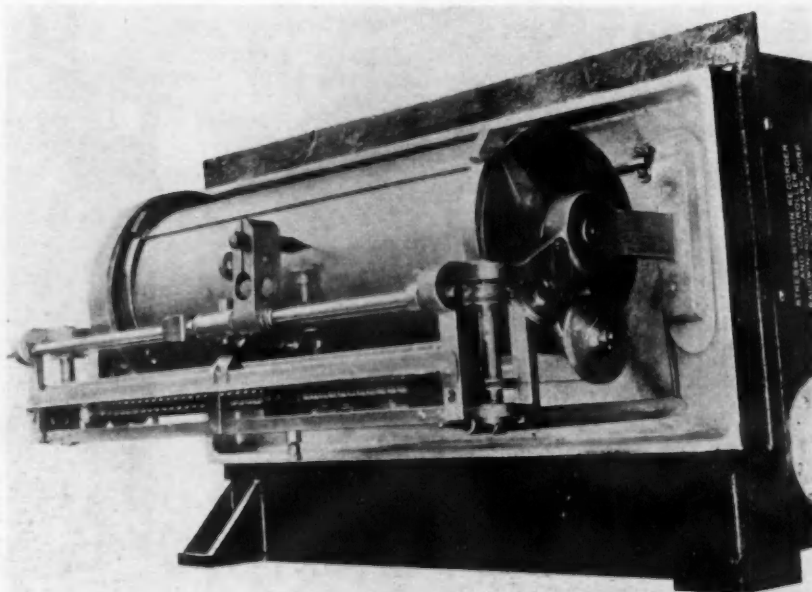


FIG. 7—To produce a constant rate of strain variation a moving contact is provided along the line of pencil travel. The velocity of this is controlled by a synchronous motor and change gears.

# Confidence Hinges on Roosevelt's Position on Balanced Budget and Sound Money

By DR. LIONEL D. EDIE

THE most important decision likely to be made in this country during the next few weeks will relate to monetary policy, fiscal affairs and the price level.

The Coolidge administration could let these matters drift and could content itself by basking in the sunshine of a speculative boom which kept most people happy while it lasted. Already in 1928, a far-sighted faction in Federal Reserve circles wanted to see adopted a monetary policy to scotch the impending speculative mania but they were not allowed to have their way. The Treasury and the administration lent aid and comfort to the "New Era" psychology and lent influence to those dominant groups who opposed clamping the lid down decisively.

The penalty was reaped by the Hoover administration, the victim of unarrested deflation. During the first three years of that administration, the prevailing doctrine taught that deflation was due to over-production, to the World War, to Europe, to war debts and reparations, to reaction from the sins of the boom. Not until 1932 did the Hoover administration make the discovery that monetary policy had to be brought into play to arrest the deflation. The Republican defeat in 1932 can be traced in large measure to procrastination in putting into effect a decisive monetary policy to combat deflation. Delay in this respect was fatal to the political hopes of the party in power.

## Hope in the New Administration

The new Democratic administration has to take its stand on monetary policy within the next few weeks. A balanced budget, sound money and an aggressive Federal Reserve policy is one road; a mounting deficit, printing-press currency, debasement of the gold dollar, and a straddling Federal Reserve policy is the other road.

If Mr. Roosevelt takes the former road, he should take it in the strongest possible spirit. A weak position would be utterly futile. If his leadership is decisive at the outset for reduction of Government expenditures and for sound money, there should be an immediate rebound of confidence. The vast amount of liquid funds now awaiting investment should begin to go to work. Refunding of the Fourth 4½ bonds should then be feasible and a funding of the floating debt could be undertaken. The psychological effects of a successful conversion operation would be striking.

Simultaneously, the Federal Reserve policy would come under consideration. A few weeks ago, the Open Market Committee partially reversed its policy of building excess reserve balances for member banks. This gives the impression in many quarters that the Federal Reserve lost its nerve in carrying a policy through. Many people wonder if this is not the same kind of vacillation as occurred on the other side in 1928-1929. Of course, the President cannot dictate to the Federal Reserve authorities, but in practice his office and that of the Treasury have had no little influence. If the new administration overlooks the importance of a strong, aggressive, persevering Federal Reserve policy, not as a political device but as a basis for fundamental economic progress, it is due for sharp disappointments.

## The Attack on Sound Money

The attack on sound money has already gained strong headway. Politicians are proposing to pay off the national debt by running the currency printing press. Important groups are proposing to cut the gold content of the dollar. Silver agitation is highly vocal. A group of business men have launched a survey of the inflation problem. Bryanism has been let loose, with a remarkable flood of propaganda.

The counter-attack has not yet been launched, but the sound money men will not indefinitely remain silent. They appear to be waiting to see what position the incoming President takes on March 4 and during the ensuing few weeks.

*If he should be captivated by Neo-Bryanism, he might be able to start a nice inflationary boom. But this boom would probably blow up in his face before 1936 and he would then have a mess on his hands just at the time when he had to go before the people for re-election. The Democratic party would be branded for the next 50 years with the record of an inflationary fiasco.*

## Some Special Phases of the Problem

Senator Harrison has planned elaborate hearings before a Senate committee to air the views of numerous authorities on how to save the nation. Acute observers suggest that the strategy is to let the spokesmen of this

or that formula "get it off their chests." No two spokesmen will be able to agree and in this very confusion lies one safeguard against adoption of dangerous schemes. This seems to be a play for time and may turn out to be a very clever move. Nevertheless, in the meantime the new administration cannot stay up in the air very long; it has to land somewhere and soon.

The war debt negotiations and the International Economic Conference have given rise to suggestions that Great Britain holds a key to the world price level. Great Britain is being urged to restabilize the pound sterling in terms of gold and to cooperate with the United States and other nations in an effort to raise the world commodity price level. Much as we may hope for tangible results along the lines of a rebirth of economic internationalism, it is doubtful if we can afford to wait for such a development to bail us out of our trouble. We have deflated more severely than have the sterling bloc of countries and we need to inaugurate decisive financial policies in our own bailiwick. A little more than 12 years ago, Democratic leadership wrecked itself on the rocks of political internationalism and there is a chance that today the new Democratic leadership will wreck itself if it leans too heavily on economic internationalism.

The plan by direct effort to lift agricultural prices promises to assume increasing importance. A continuation of the present level of farm prices carries the menace of a new wave of hoarding and bank failures later this year and of insufferable losses to financial institutions which hold farm mortgages. Moreover, it calls for larger Government appropriations for mortgage relief and this in turn raises the Federal deficit and carries right back to the question of sound fiscal policy. A new, positive agricultural policy is necessary and is a logical corollary of an effective monetary and fiscal policy in national affairs.

## The New Administration's Opportunity

The new administration has a remarkable opportunity to assert strong leadership in the direction of a balanced budget and of sound money. At the moment there exists a new hope that the Roosevelt leadership will step out boldly and unmistakably. Confidence is ready to spring into being the instant there appears confirmation of this new hope. To blast that hope would be unfortunate.



# Baling Presses Designed to Give High Rate of Production

BY A. C. BUTTFIELD

Vice-President, Vulcan Detinning Co., Sewaren, N. J.

**P**RESENT economic conditions call for careful studying of the problem of cost reduction in every industrial operation. To those concerned with baling various materials, the new baling presses here illustrated will doubtless prove of interest.

Fig. 1 shows a press designed to bale light gage sheet steel scrap, forming a bundle 16 in. by 16 in. by a variable dimension depending on the amount of material charged. Briefly, the press consists of a box 6 ft. 6 in. long, 16 in. wide and 6 ft. 10 in. deep, in one side of which is a door, hinged at a point 1 ft. 10 in. from the bottom of the box and furnished with means for opening and closing. Above the box is a primary compression ram actuated by hydraulic plungers located at the back of the box and connected to the ram through a system of arms and cranks. At one end of the box is a secondary compression ram 16 in. by 16 in. in section, connected through a crosshead to an 18 in. hydraulic plunger. Connected to the same crosshead are two 8 in. pullback plungers, one on each side of the box. At the opposite end of the box is a compression chamber 16 in. by 16 in. by 5 ft. long. On three sides of this chamber are mounted hydraulic plungers which press against clamping fingers, hinged at one end.

## How It Operates

In operation, a charge is deposited in the box, the door closed, and the primary compression ram lowered, compressing the scrap initially into a space 16 in. by 16 in. by 6 ft. 6 in. The secondary compression ram is then put into motion, pushing the

charge into the compression chamber and pressing it against a previously formed bale, which is held in place by means of the clamps previously mentioned. When the desired degree of compression is reached the clamps are released, allowing the bundles to move forward until the second bale has assumed the position previously occupied by the first. Meanwhile the door has been opened, the primary compression ram is raised, and upon the return of the secondary compression ram the press is ready for the next cycle.

In the press shown, the operator has only to move the door operating lever, all subsequent operations being automatic, the press finally stopping in position to receive the next charge.

Hydraulic fluid is supplied to the door, primary compression and clamp-

ing cylinders at 2000 lb. pressure, through an accumulator system. For the secondary compression and pullback rams, a 5½ in. by 18 in. double-acting duplex pump is used, pumping direct to the cylinders. In the case of this large pump, which has a capacity of 470 gal. per min., pumping direct results in a considerable saving in power, as the pressure is raised only to the point actually required throughout the stroke.

## Bulky Scrap Charged Rapidly

Due to the large space available for the charge, (in the case of the press described, about 100 cu. ft.) bulky scrap can be charged rapidly, as no tamping is necessary to get in a reasonable weight. The design also increases materially the time available for charging, for as soon as the secondary compression ram enters the compression chamber the door can be opened, the primary compression ram raised, and the insertion of the next charge commenced while the secondary ram is still moving forward. As a result, unless the charging rate is very slow, a second cycle can be started as soon as the secondary ram completes the return stroke. This fea-

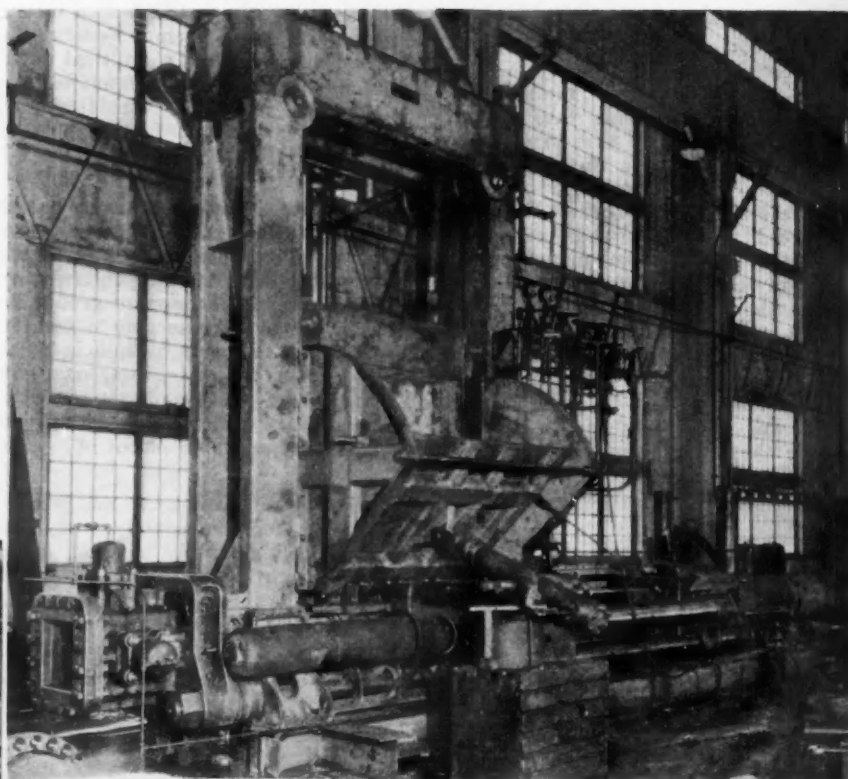


Fig. 1—(Above) Light-gage sheet metal scrap is baled into a bundle 16 in. by 16 in. by a variable dimension, depending on the amount of material charged. The operator has only to move the door-operating lever, all subsequent operations being automatic.

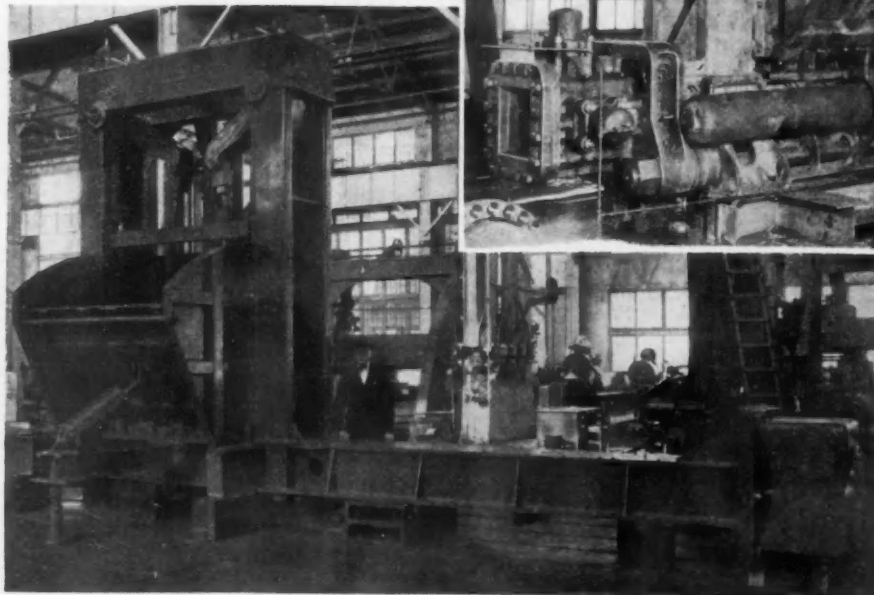


Fig. 2—(At Left) Where high density is not required, a baling press similar to that in Fig. 1, but with the compression rams screw driven by direct connected motors can be supplied.



ture also eliminates the necessity for any auxiliary charging hopper.

The finished bales may be delivered automatically, if necessary to a remote point, without any auxiliary conveyor. In one installation the bundles are pushed under two railroad tracks and up a curved chute from which they drop direct into the car, ready for shipment. The face of the ram forms a square, even end on each bale and there is no tendency for the bundles to stick together.

Large reductions in baling costs have been effected through the use of this press. Only one operator is required and because of the automatic control he can also charge the scrap by means of a grab bucket after it has been delivered to an adjacent point. The average length of the bales is 14½ in. and the weight about 400

lb., the density being 36 per cent, and as a cycle can be made in less than 25 sec. an output of 25 gross tons per hour is obtained. This figure could be increased, as the press can easily accommodate 500 lb. per charge, but in this particular instance it is desirable to keep the bale length down. In addition to the operator, one man is engaged in shifting the car for the finished bales, and performing other duties not entirely connected with the pressing operation proper. Including this second man the operating labor is only 2/25 man hours per ton. The power required is about 4 kwhr. per ton. Therefore, on the basis of 50c. per hour for labor and with power at 1c. per kw., the total direct cost is but 8c. per gross ton.

For baling materials where a high density is not required, presses em-

bodifying the same principles, but with the compression rams screw driven by direct-connected electric motors, have been found very satisfactory. A press of this type is shown in Fig. 2.

Some similarity may be noticed between the presses described and the well-known continuous hay baling press. In adapting the principles involved to the baling of metal scrap, many improvements and changes were necessary, for some of which patent applications have been made. Development was begun about four years ago by the Vulcan Detinning Co. and the first commercial machine was put into operation a year later. Subsequent machines were designed and built by the Baldwin-Southwark Corp., which made a number of refinements and developed the means for automatic operation.

## Profile Grinder Facilitates Making of Form Tools and Gages

THE Naumann profile grinding machine being marketed in the United States by the George Scherr Co., 128 Lafayette Street, New York, is designed to simplify the making of templet gages, forming tools and similar parts having irregular contours. With the grinding wheel, it is possible to finish grinding the piece after hardening or to work directly from the solid piece, either hardened or soft.

The principle on which the machine is based is the use of a 50-times magnified drawing from which the contour is reproduced through a pantograph. The pantograph governs a hairline cross in a Zeiss microscope, through which the work is observed

under 40x magnification. In this way the machine grinds to microscopic tolerances directly from the drawing.

Arrangement of the grinding wheel head, work-slide, and the pantograph with microscope and drawing board may be seen in the illustration. The grinding wheel-head is mounted on two slides which can be turned in any direction. The wheel-head unit includes a gear box, wheel spindle and the individual motor. The drive is by endless belt. The wheel spindle is provided with a reciprocating stroke, up and down, which is adjustable and for which two speeds are available. The wheel-head swivels in two vertical planes at right angles to each other, so that forming tools with different rakes can be produced.

The work slide is a cross carriage mounted on a cylindrical post, which is adjustable in height. To limit the movement of the work-slide in longitudinal and cross directions, stops are provided in the center of the guide-ways. These stops are so made that standard gage blocks can be inserted, and when working against the stops, the correct setting is obtained from dial indicators.

During the grinding operation, the gradual formation of the profile to be produced on the work is constantly observed through the Zeiss microscope having a magnification of 40x and showing a hair-

line cross in the field of view. The procedure in grinding is to feed the wheel into the work until it touches the hairline cross, as viewed in the ocular. In this way, wear on the wheel is automatically compensated for.

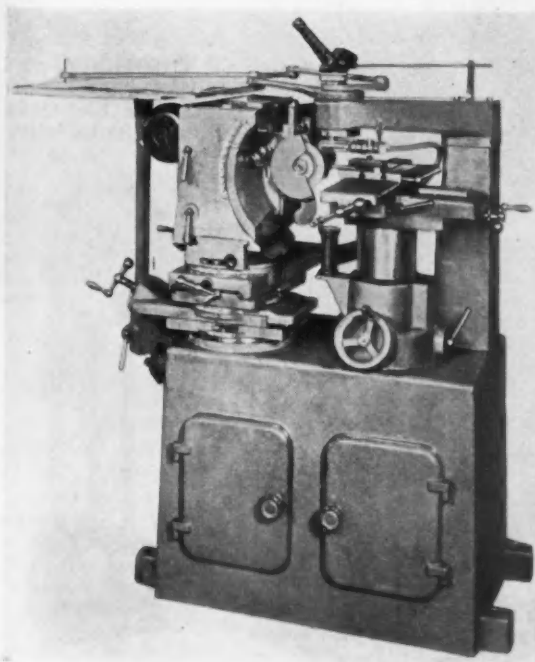
Attached to the microscope is the pantograph system which governs the microscope or hairline cross, respectively, in reference to the drawing from which the profile is being copied. In other words, the hairline cross of the microscope travels along the profile to be produced, point for point.

The maximum range of work on the machine is 6 in. by 29/16 in. With a reciprocating grinding wheel stroke of 2 in., pieces up to about 1½ in. in thickness can be ground. A complete dust exhaust system, including air filter and individual motor, is provided.

## Tractor-Type Arc Welder for Field Use

A PORTABLE gas engine arc welder, mounted on a crawler-type tractor, for field use, has been brought out by the Universal Power Corp., Cleveland. The welder, driven by a traction engine, is a standard Universal welder utilizing the shunt induction principle of arc stabilization. The tractor is of the Cletrac type built by the Cleveland Tractor Co. The welder is designed for use in places that are difficult to reach. Uses for which it is intended include maintenance of way welding for railroad tracks and bridges, in pipe line construction and repairs and in structural steel erection. It is stated that the mounting of the welder does not prevent fullest use of the tractor for draw bar work. The welder assembly may be demounted easily by removal of a few bolts.

The Chamber of Commerce of the United States will hold its twenty-first annual meeting in Washington, May 2 to 5.



## Two-Bladed Counterbore for Deep Holes

FOR deep counterboring operations, where considerable metal is removed, the O. K. Tool Co., Inc., Shelton, Conn., has developed the counterbore illustrated. Only two cutter blades are employed, these blades being adjustable. The blades are inserted into a forged and heat-treated alloy-steel body and interlock with a pilot which guides the tool through the bore. The body is cut away so that the chips may be properly disposed of through the hole.

The tools are made in sizes ranging from 1½ to 6 in. in diameter. Cutter blades made of drop-forged high-speed steel, super-cobalt high-speed steel, Stellite, J metal, or cemented carbide are available.

## Trims Flash From Welded Barrels

FOR trimming the flash or upset from butt welded seams of steel barrels, grease drums and other cylindrical work, the Morton Mfg. Co., Muskegon Heights, Mich., has developed a new draw-cut flash trimming machine having a cutting stroke of 40 in.

The machine is electrically controlled throughout, either by hand or foot-operated push button. There are no toggle joints, and air-operation is not employed. The machine trims on the inward or draw-cut stroke of the

rams. Depressing a push button automatically clamps the work and starts the rams on the inward stroke. At the completion of the cut, the upper ram raises 2 in., which permits the work to be removed while the ram is returning to the out position. The machine is arranged to compensate automatically for any slight variation in thickness or taper of the metal. The distance from center of the ram to the floor is approximately 42 in. The floor space required is approximately 5 x 12 ft., and the shipping weight of the machine is 6000 lb.

## New Sartorius Analytical Weights Reduce Errors

USE of fewer weights, with a consequent reduction of errors, features the new Sartorius 1-2-3-5 arrangement of analytical weights being marketed by Pfaltz & Bauer, Inc., 300 Pearl Street, New York. In weighing a mass of 33.33 grams, for example, only four gram weights (30.00, 3.00, 0.30 and 0.03) are required, as compared with eight weights by the former Sartorius arrangement.

Savings in time are attributed to the fewer number of weights handled, and as there are no two weights of the same denomination, no time is lost in the identification of weights. A single calibration correction is applied to any particular mass rather than a correction for each weight.

These new analytical weights are available in two series, the 18X and

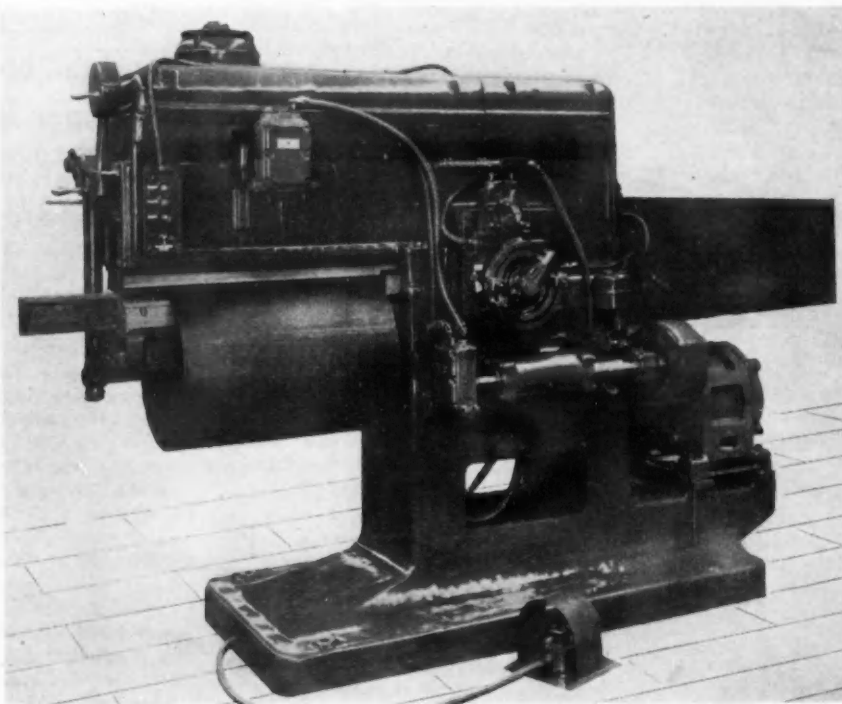
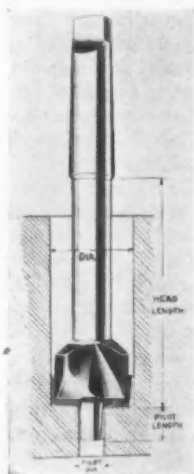
the 118X, respectively. The former are adjusted to meet the requirements of the Bureau of Standards class S weights and the Physikalisch-Technische - Reichsanstalt. The gram weights are of two-piece brass, plated either with gold, chromium or platinum. Fractions above 20 mg. are platinum and below, of aluminum, all under glass. Six different sets from 1 mg. to 20 grams and from 1 mg. to 1000 grams are available in the 18X series.

The 118X series is adjusted to twice the tolerances of the Bureau of Standards class S weights. It is made in two sets, 1 mg. to 50 grams and 1 mg. to 100 grams. Both series are furnished in a plush-lined mahogany case, with two mg. riders and a pair of ivory-tipped forceps.

## Tensile Strength Tester

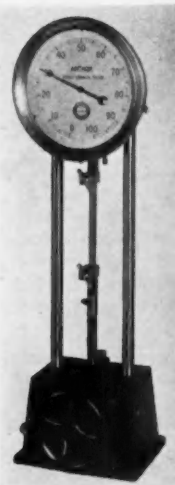
A WIDE variety of materials can be tested on the tensile testing machine here shown which is being marketed by the Amthor Testing Instrument Co., 309 Johnson Street, Brooklyn, N. Y. Simplicity, as well as accuracy and rapid operation, is claimed. The dial is 8½ in. in diameter and is graduated in fractions of either pounds or kilograms. The dynamometer spring movement is said to be of special design to assure proper test sensitivity. When the specimen breaks the pointer remains at the tensile strength reading. Jaws and jaw travel can be had to conform with standard test methods for wire, rubber and other materials.

ONLY two cutter blades are used in the deep hole counterbore pictured below.



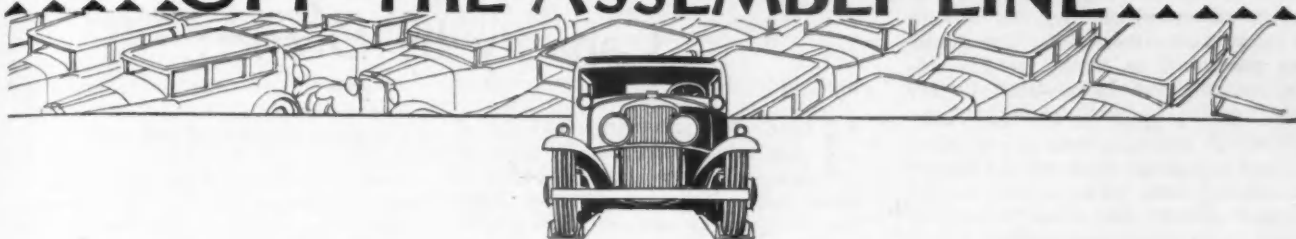
This draw-cut flash trimmer, for use on welded steel barrels and grease drums, has a stroke of 40 in. It is electrically controlled throughout, both hand and foot-operated push buttons being provided.

SIMPLICITY and rapid operation feature the tensile tester shown below.





# OFF THE ASSEMBLY LINE



## Ford's Production Increasing as Labor Tension in Detroit Eases

DETROIT, Feb. 14.

**I**NCREASING production of Ford cars, public announcement of the new large Ford, maintenance of a high operating rate by Chevrolet and Pontiac, an easing of the tension in Detroit's labor difficulties, and indications that January production and retail sales exceeded those in the same month of last year, are factors contributing to a better feeling in the automobile industry. Chevrolet continues the chief support of the steel trade, but Ford will soon resume its role as a major buyer of steel.

Ford's Model 40 retains the V-eight, 90-deg. angle motor, but the horsepower has been increased from 65 to 75 by the use of an aluminum cylinder head which allows higher compression with resultant gains in power, speed and acceleration. A new frame construction consists of four members, two of which form an X-brace. The X channels are brought together by a semi-circular member on which the rear end of the power plant rests in a rubber mounting. The rear axle is new and of the three-quarter floating type. A synchronized type of transmission now employs helical instead of spur gears, with silent second. The tire size has been increased from 5.25 to 5.50, with 17-in. welded wire wheels. The wheelbase has been lengthened from 106 to 112 in., giving an extra foot of room inside the car. New headlamps, requiring an unusually deep draw, are of rustless steel. There is a dull rustless steel radiator grill. Along the center of the front hood and around the exterior of the radiator grill is a wide rustless steel bead. The cylinder block, exhaust passages and crankcase are cast in one piece, as they were in Model 18.

The 65-lb. crankshaft is a steel forging. Apparently the cast crankshaft is to be introduced first on the smaller Ford to be announced later. The entire floor of the body is steel, whereas formerly the front half was wood and the rear half steel. Alloy

steel valve inserts are standard equipment, making it unnecessary to grind valves until the car has been driven 30,000 to 50,000 miles. Springs still are of the transverse type. The engine bore and stroke are 3 1/16 in. and 3 3/4 in. respectively, giving a piston displacement of 221 cu. in. The car looks like no previous Ford and could not be identified as such except for the V-8 insignia. Its V-shaped radiator, skirted fenders and windshield at a slant of 20 deg. are in thorough accord with the 1933 fashion.

### Ford Prices Near Chevrolet's

Prices of the new Ford, which are about the same as those of the previous V-eight, put it squarely in competition with Chevrolet. Model 40 roadster is \$475 against \$485 for Chevrolet, the coupe \$490 compared with \$495 for Chevrolet, the coach \$500 against \$515 for Chevrolet, and the four-door sedan \$560 compared with \$565 for Chevrolet. The flow of Ford bodies from Briggs and Murray is approaching normal. Ford is resuming manufacture at Rouge as rapidly as possible and most of the 40,000 men who were laid off during the plant shutdown are back at work. The immediate goal at Rouge is to get 1200 motors a day coming off the line, but this will later be raised to 1500.

Ford has given some steel releases, including front axle billets, and is expected to place orders for larger tonnages in the next week. One of its inquiries, put out before the suspension at Rouge, was for carbon steel forging billets which it will furnish to its suppliers. Heretofore Ford has produced this material in its own steel mills and shipped it to vendors' plants. Billets now in stock at Dearborn are all of alloy steel. Ford's production total, so far as real volume is concerned, will first be felt in March; it is virtually impossible to tell what February output will be owing to the delays caused by the strike at the Briggs and Murray body plants. It is understood that the shutdown at Rouge has made it im-

possible to get the small V-eight car out until nearer May 1 than the original date of April 1. It is no secret that the small model 44 will be Ford's "bread-and-butter" offering for the year and one to which Mr. Ford personally is devoting his time and engineering genius.

### Chevrolet Operations Sustained

Chevrolet has not paused in its operations which will lead it across the 55,000-car line this month. Many of its plants are continuing to run six days a week; the company's morale has never been higher owing to the fact that the sales showing since the car's introduction has been remarkable. Incidentally, the Chevrolet purchasing department is now buying materials and parts for Pontiac cars which are to be assembled in Chevrolet branch assembly plants.

Oldsmobile, holding to a pace of about 6000 cars this month, is in the market for steel for 2000 jobs. Revised figures for January reveal that the Chrysler Corp. made about 16,500 cars, of which 8500 were Plymouths and 5100 Dodges. Cadillac assembled 700 cars and Packard 600. Willys made approximately 5000 cars, Buick 5000, Studebaker 2100, Rockne 1700 and Nash 2000.

Excluding Ford, for which no figures are available, the industry made 115,915 cars in January, an output exceeding that of every month in 1932 except March and April. Last month General Motors sold to consumers in this country 50,653 cars against 19,992 in December and 47,942 in January a year ago. Sales to dealers totaled 72,274 compared with 44,101 in December and 65,382 in January a year ago. R. L. Polk & Co. estimates that January passenger car sales were 91,000 cars, compared with 87,493 units in January, 1932, and 45,529 in December.

It is too early to foresee definitely what effect the eight days' closing of all Michigan banks will have on automobile production, although it is be-



lieved that it will not be serious. The larger companies have outside banking resources which they can call on in the present emergency. Operations are preceding as usual today. Activities at Great Lakes Steel Corp. are expected to continue without interruption.

Ford has given some parts releases for 10,000 cars. The strike at the Hudson Motor Car Co. has about ended, with production getting under way today, workers having voted to return to their jobs.

#### Detroit Notes

Great Lakes is operating three of its six open-hearth furnaces . . . The cylinder block, manifold and exhaust pipe of Dodge engines are being painted with a new heat-resisting aluminum coating, called Permite Resalum, manufactured by Aluminum Industries, Inc., Cincinnati . . . Automotive electrical generator, starter and ignition manufacturing operations of the Delco Appliance Corp., Rochester, N. Y., General Motors unit, is being merged with Delco-Remy at the latter's Anderson, Ind., plant.

## British Production of Pig Iron and Steel Gains

LONDON, ENGLAND, Feb. 14 (*By Cable*)—Output of pig iron and steel ingots in the United Kingdom in January was slightly higher than in December. Pig iron output was 286,600 tons against 284,500 tons in December, while steel output was 444,400 tons compared with 430,400 tons in December.

Monthly totals for 1932 follow:

1932	Pig Iron	Steel Ingots
Jan. ....	332,400	429,700
Feb. ....	318,100	480,600
March ....	335,600	462,800
April ....	316,900	433,300
May ....	315,300	416,900
June ....	311,400	459,300
July ....	292,600	430,300
Aug. ....	259,400	361,500
Sept. ....	260,400	430,300
Oct. ....	275,600	438,500
Nov. ....	267,700	473,800
Dec. ....	284,500	430,400
	3,569,900	5,247,400
1933		
Jan. ....	286,600	444,400

## Machine Tool Sales Lower in January

Machine tool orders in January did not maintain the increased volume of December, according to the monthly report of the National Machine Tool Builders' Association. However, the three-months' average showed an increase. The index figure of sales for last month was 31.6 compared with 35.8 in December. The three-months' average was 33.1 against 31.7 for December.

Unfilled orders Feb. 1 were 48.6 compared with 45.4 at the end of December. January shipments were 26 against 32.3 the previous month.

# Revised Data on Steel Producing Capacity by Districts

THE steel-producing capacity of the country grouped by districts has again been surveyed by THE IRON AGE. Thirteen districts have now been set up against 12 in a compilation made two years ago (THE IRON AGE, Jan. 1, 1931, page 94). The Detroit facilities, formerly included with Cleveland, have now been made into an independent district. The accompanying table lists the capacities in gross tons of ingot and also the relative size of the districts.

Pittsburgh retains the leading position, but its percentage of the total is 23.4 while two years ago it was in first place at 24.3 per cent. The Chicago district has now 22.7 per cent against 20.2 per cent at the beginning of 1931. Other noteworthy changes are that Philadelphia displaces the Valleys as the third district in size, although in percentage of the whole it is smaller than was the case two years ago, the percentage factors being 11.4 now and 11.9 then. The Valleys (comprising Pennsylvania west of Pittsburgh and southeastern Ohio) showed an actual write-down of capacity and its position is 11.2 per cent in 1933 against 12 in 1931.

## Industrial Groups Meet to Discuss Legislation

A Federal legislative program was considered at a luncheon meeting called by James W. Gerard, former ambassador to Germany, last Friday, at the India House, New York, to bring immediate relief to the industries which are affected by the dumping of foreign products from countries with depreciated currencies. The representatives of approximately 30 industries affected by foreign competition, together with representatives of the American Federation of Labor, were present.

The iron and steel industry was represented by Thomas J. Doherty, tariff counsel of the American Iron & Steel Institute, and Thomas W. Kennedy, of the Mystic Iron Works, and the scrap industry by Benjamin Schwartz, director general of the Institute of Scrap Iron and Steel.

## Charles F. Abbott Predicts New Era for Steel

Steel piers, steel foundations, steel walls, steel floors, steel residences are ready for the market. They will be cheaper and will make for better construction, declared Charles F. Abbott, executive director of the American Institute of Steel Construction, in an

### Steel Capacities Jan. 1, 1933

	Per Cent	Tons	Tons
Pittsburgh	23.4	16,308,100	172,000 up
Chicago	22.7	15,846,800	2,460,000 up
Phila.	11.4	7,972,800	59,400
Valleys	11.2	7,770,000	196,000 down
Cleveland	9.5	6,651,000	70,800 up
Buffalo	4.9	3,389,000	550,000 up
Wheeling	4.5	3,120,000	126,600 down
Southern	3.2	2,265,700	128,700 up
Ohio River	2.8	1,982,500	107,800 up
Western	2.5	1,740,200	79,200 down
Detroit	1.9	1,311,400	192,000 up
St. Louis	1.3	940,000	30,000 up
Eastern	0.7	502,100	19,000 up

69,749,600

The Buffalo district gained notably, having now 4.9 per cent of capacity against 4.3 formerly, and it has displaced the Wheeling district, which now represents 4.5 per cent instead of 4.9, two years ago.

The Cleveland district proper contains 4.3 per cent of the whole, but when central Ohio plants are included, it covers 9.5 per cent.

The grand total shows a 1,450,000-ton increase for the year, for the capacity at the beginning of 1932, as given by the American Iron and Steel Institute, was 68,298,956 tons.

address before the ninth annual conference of the Iron, Steel and Allied Industries of California at Del Monte, Cal., on Feb. 9. Mr. Abbott said that these improvements in steel construction, developed by intensive research during recent years, represent the industry's program to bring its business back to a prosperous basis.

"Human nature is weak and human beings require the spur of hard times to force them to improved positions," said Mr. Abbott. "It is for that reason that the greatest industrial improvements are designed and planned during periods of business depression. Through a greater knowledge of the nature of our raw materials and by means of improved knowledge of the methods of utilizing them we can make structural steel render a greater service than ever before. We can remake or rebuild our entire world.

"Scientific research and invention will bring into existence new industries that will surpass any that we have as yet promoted. This development will be vast and magnificent. It will be a period of far greater opportunities and those who have the will to conquer will benefit the most."

The annual meeting of the Iron and Steel Institute will be held at the Institution of Civil Engineers, Great George Street, London, England, May 4 and 5. The autumn meeting is scheduled for Sept. 13 and 14 at Sheffield.

# Intermittent Operation of Blast Furnaces Pronounced a Success

**T**HAT the operation of blast furnaces on intermittent schedules or on low wind is now being carried on successfully by practically all companies was indicated by discussion at the mid-winter meeting of the Eastern States Blast Furnace and Coke Oven Association, held in Pittsburgh on Feb. 10.

In response to one of the questions for discussion which asked, "With a plant having two or more furnaces of essentially the same equipment and capacity, can a daily demand equal to the normal maximum capacity of one furnace be met at lowest total cost by the continuous operation of two furnaces at 50 per cent of that rating?" it was brought out that the majority of operators would prefer to operate one stack at close to capacity. Nevertheless, two or three of those entering the discussion pointed out that lower coke cost, less loss in flue dust and other factors might make it more desirable to operate two stacks on low wind, particularly if they had not been lined recently and the depreciation factor with respect to this might be discounted.

However, the practice of operating on low wind or intermittently has not yet been carried on long enough to determine definitely the effect on furnace linings. It was also stated that at some plants a low wind operation had resulted in colder metal, with a consequent increase of scrap in transfer to the open-hearths. One furnace had eliminated this difficulty by covering its ladles after pouring. However, it was generally admitted that after 12 to 18 months of production at reduced levels, most of the original difficulties have been ironed out, and operations are being carried on with no objections to the quality of iron produced, or to the general furnace practice necessitated.

Considerable difference of opinion arose over the question, "How much packing space, if any, should be left between the furnace shell and the lining?" The general practice seemed to be to allow 2 to 4 in. of space for packing, with an extension of the lining at fixed intervals to prevent settling. The weight of brick work which should be allowed for each square foot of heating surface in hot blast stoves was also considered.

A formal paper on "Iron Oxide Sintors," by T. L. Joseph, supervising engineer, North Central Experimenting Station, United States Department of Commerce, was presented at a joint meeting of the blast furnace and coke oven groups in the afternoon.

At the coke plant section during the morning Fred Denig, vice-president, Koppers Research Corp., presented a paper on "New Ideas on Sulphur

Removal and Ammonium Sulphate Manufacture." Subjects discussed informally at this meeting included the possible improvement in the quality of washed coal resulting from the dedusting of the feed coal for a wet washer, the effect on the quality and quantity of by-products caused by long coking time and intermittent oven operation, and whether or not refractory cements now available will answer the purpose for putting cold ovens back into condition.

E. T. Weir, chairman of the board, National Steel Corp., gave an informal talk on general business conditions at the dinner meeting.

## Unfilled Orders Drop 69,496 Tons

Unfilled orders of the United States Steel Corp. as of Jan. 31 declined 69,496 tons, or from 1,968,140 tons at the end of December to 1,898,644 tons at the end of January.

Unfilled orders at the end of each month since 1930 follow:

	1933 Tons	1932 Tons	1931 Tons
January	1,898,644	2,648,150	4,132,351
February	.....	2,545,629	3,965,194
March	.....	2,472,413	3,995,330
April	.....	2,326,926	3,897,729
May	.....	2,177,162	3,620,452
June	.....	2,034,768	3,479,323
July	.....	1,968,302	3,407,816
August	.....	1,969,595	3,169,457
September	.....	1,985,090	3,144,833
October	.....	1,997,040	3,119,432
November	.....	1,968,301	2,933,891
December	.....	1,968,140	2,735,353

## Senate "Buy American" Bill Wins Favor

WASHINGTON, Feb. 14—The so-called "Buy American" amendment carried in the Treasury-Postoffice Department appropriation bill as passed by the Senate is more liberal than the Wilson bill recently passed by the House. The general sentiment in Congress appears to be favorable to the Senate measure.

The Senate provision, like the Wilson bill, covers all Government purchases and contracts to supply materials for Government work. It calls for supplies of United States origin which can be furnished "in sufficient and reasonably available commercial quantities." The Wilson bill called for supplies wholly of United States origin and because of this feature met with the objection that virtually all supplies consisted of a certain quantity of foreign material, especially raw products, though often the proportion is small. Further exceptions to the use of domestic materials are made where heads of Gov-

ernment departments or independent establishments determine that the cost is unreasonable, and where they find that in respect to some particular supplies it is impracticable to require domestic materials or that their use would unreasonably increase the cost.

In cases where use of domestic material is impracticable and would unreasonably increase the cost, Government officials would be required to keep a public record of the findings which justified the exception.

## Domestic Machinery to Be Bought for Hoover Dam

WASHINGTON, Feb. 14—Now that "Buy American" legislation is assured at this session of Congress, domestic manufacturers are virtually certain to get approximately \$17,000,000 worth of business for equipping the Hoover dam power plant with machinery. Had it not been for protective legislation, however, the Bureau of Reclamation, Department of the Interior, would have been compelled to make awards for the machinery to the lowest bidders. It is known that German makers were prepared to submit figures well below those which American machinery manufacturers could possibly name.

It was by reason of this situation that the Bureau of Reclamation postponed from Feb. 3 to March 1 the opening of bids for seven turbines for the Hoover dam plant, which will cost between \$2,000,000 and \$3,000,000. Five of the turbines will be of 115-hp. each and two of 55,000-hp. each. The bids will be opened at 10 a. m. in the Denver office of the bureau. At least five or six American makers are expected to present bids.

Early in the summer the Denver office will open bids for the generators for the Hoover dam plant. These also will cost between \$2,000,000 and \$3,000,000, it is estimated. Later bids will be opened for the additional machinery requirements for the plant.

## Canada's Pig Iron Output 144,130 Tons in 1932

Final statistics show that the production of pig iron in Canada during 1932 totaled 144,130 gross tons compared with 420,038 tons in 1931 and 747,178 tons in 1930.

Imports of pig iron during 1932 amounted to 4753 tons, a decline of 39 per cent from the total of 7912 tons brought in during 1931. Exports were recorded at 2029 tons compared with 2787 tons in the previous year.

Stocks of pig iron held by the producers at the end of 1932 totaled 125,000 gross tons.



# PERSONALS

ROBERT D. BLACK has been appointed sales manager of the Black & Decker Mfg. Co., Towson, Md. He has a background of shop experience, plus years as a salesman and later as branch manager of sales in the Pennsylvania territory. Mr. Black has also served as advertising and sales promotion manager.

♦ ♦ ♦

H. J. FRENCH, who is in charge of alloy steel and cast iron development for the International Nickel Co., Inc., New York, addressed the Detroit chapter of the American Society for Steel Treating on "Some Aspects of the Hardening of Steel" on Feb. 13.

♦ ♦ ♦

H. W. STRONG has been elected president of the Strong, Carlisle & Hammond Co., Cleveland machinery dealer, succeeding L. J. HAMMOND, who retains his position on the board of directors. Mr. Strong has been vice-president and general manager and continues in the latter capacity.

♦ ♦ ♦

EDWARD N. HURLEY, JR., has been reelected president of the American Washing Machine Manufacturers' Association. This is his fourth consecutive term.

♦ ♦ ♦

L. B. LINDEMUTH, steel plant engineer, whose experience has taken him to most of the important steel plants in this country and to many in Europe, will deliver a series of talks on "Steel Metallurgy and Operating Problems" at the School of Mines Building, Columbia University, New

York, commencing March 7. There will be ten lectures, one a week, which will be open to advanced students of metallurgy and to metallurgists and operating men from the steel industry. The purpose of the lectures will be to correlate theoretical training with practical problems, and discussions will follow the lectures.

♦ ♦ ♦

GEORG MASING, professor of metallurgy in the Technical High School, Berlin, Germany, and identified with the research laboratories of Siemens & Halske Co., spoke on the "Age Hardening of Metals" at Columbia University, New York, under the auspices of the department of chemical engineering. Professor Masing is scheduled to speak at the meeting of the New York chapter of the American Society for Steel Treating on Feb. 20.

♦ ♦ ♦

EDWARD P. CONNELL, who has been identified since 1913 with the Falk Corp., Milwaukee, has been appointed a vice-president. In 1924 he was made comptroller, which office he will retain in connection with his new appointment.

♦ ♦ ♦

RAYMOND L. COLLIER, for a number of years assistant managing director of the Steel Founders' Society of America, has been appointed managing director of that organization to succeed GRANVILLE P. ROGERS, who has severed his connection with the society to become affiliated with the Paper Cup Manufacturers Institute, New York.

fied with the malleable iron business throughout his entire business life.

♦ ♦ ♦

RUDOLPH J. SCHWAB, founder and president, R. J. Schwab & Sons Co., Milwaukee, pioneer foundry owner and furnace manufacturer, died Feb. 5 at his home in Miami, Fla., aged 82 years. He was born in Oshkosh, Wis., and established the Schwab company in Milwaukee in 1876. He retired in 1919.

♦ ♦ ♦

OTTO A. EHBE, secretary-treasurer and general superintendent, Milwaukee Boiler Mfg. Co., Milwaukee, died Feb. 7, aged 72 years. He was born in Oshkosh, Wis., and went to Milwaukee when 16, where he became associated with the boiler company in 1893.

♦ ♦ ♦

JOHN A. BENNING, general superintendent, Milwaukee Dry Dock Co., Milwaukee, died Feb. 7, aged 79 years. He was born in Milwaukee and joined the shipbuilding concern as a boy. He rose to the position of general superintendent when 32 years old and functioned in that capacity for 47 years. Mr. Benning supervised the construction of some of the largest vessels on the Great Lakes in both the wood and steel eras.

♦ ♦ ♦

HARRY G. NYE, president the Nye Tool & Machine Works, Chicago, since he organized it in 1904, died Feb. 8 after a very brief illness. He was born at Richmond, Ind., 59 years ago.

♦ ♦ ♦

GEORGE F. EGGERT, works auditor at the South Chicago plant of Republic Steel Corp., died Feb. 6. He had worked for the Republic Iron & Steel Co. before going with the Interstate Iron & Steel Co., which was absorbed by the Republic Steel Corp.

♦ ♦ ♦

CHARLES E. PATTERSON, formerly vice-president of the General Electric Co. and president of the General Electric Supply Corp., died after a long illness at St. Petersburg, Fla., Feb. 12.

♦ ♦ ♦

J. C. STINE, one of the founders of the J. C. Stine Co., maker of mining machinery, Tyrone, Pa., died on Jan. 28, aged 65 years. He was secretary and treasurer of the company at the time of his death.

Steel columns for bridges and buildings were among the research projects completed during 1932 by the Engineering Foundation, New York. A book on the "Alloys of Iron and Molybdenum," the first in its series of the combinations of iron and steel with other substances, was published by the iron alloys research committee. Research projects aided by the foundation include centrifugal apparatus for testing mining excavation methods, models of structures and specimens of materials; effects of temperature on metals; cutting of metals; lubrication of machines and cars; electric welding.

# OBITUARY

WILLIAM R. HILL, president of Sargent & Greenleaf, Inc., Rochester, N. Y., died at his home in that city after a long illness on Feb. 6, aged 66 years. As a boy of 14 he went to work for Sargent & Co., hardware manufacturer in New Haven, Conn. Subsequently he became identified with the Yale & Towne Mfg. Co., which he served as general sales manager for 22 years. Prior to his election to the presidency of Sargent & Greenleaf, Inc., in 1923, he was vice-president of the Isko Co., Chicago, maker of ice machinery.

♦ ♦ ♦

CHARLES V. BARRINGTON, vice-president of Jenkins Brothers Co., New York, died at his home at Black Rock, Conn., on Jan. 30, aged 71 years. He was a native of Chicago and by his work at the World's Fair in 1890 attracted the attention of Richard T. Crane of the Crane Valve Co., with which Mr. Barrington later became

identified. He went to Russia and Italy in the interests of Mr. Crane and George Westinghouse to direct the construction of factories for the Westinghouse Air Brake Co. and returned to the Crane company in 1913.

♦ ♦ ♦

WILLIAM BENNETT, for the past 30 years production engineer and chief inspector of the Union Steel Casting Co., Pittsburgh, died of pneumonia on Feb. 3, aged 75 years.

♦ ♦ ♦

L. M. TODD, one of the organizers and president of the Todd Co., Rochester, N. Y., died at the Highland Hospital in that city on Feb. 2, aged 71 years. He was the inventor of a number of devices, among them a check-writing machine.

♦ ♦ ♦

A. W. WAGNER, president of the Wagner Malleable Iron Co., Decatur, Ill., died of heart disease on Feb. 5, aged 60 years. He had been identi-



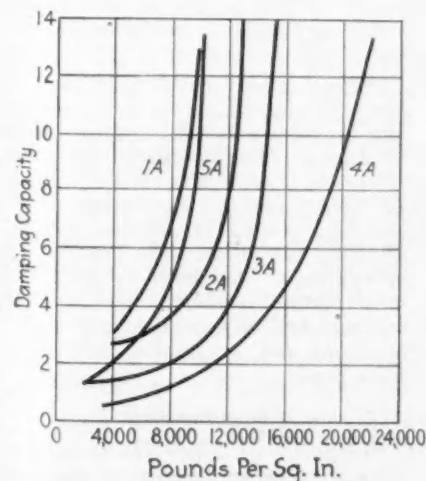
## Government Competition With Foundries Reviewed

WASHINGTON, Feb. 14 — Because the activities of arsenals and Navy yards are so intimately connected with the whole field of national defense the Shannon committee, which last week made a report on Government competition with private business, said it does not feel justified in making specific recommendations with reference to arsenals and Navy yards curtailing their various activities. It did recommend, however, that a study be made of all cost accounting factors in Government operations. After such a study shall have been made, the committee stated, it "would be inclined to favor the award to private industry of such activities of arsenals and Navy yards as are not incompatible with national defense."

This section of the committee's voluminous report is based on complaints made at hearings before the committee by private foundry operators. They objected to Government competition through arsenal and Navy yard foundries and said that private foundries can produce more cheaply than the Government foundries can. The foundrymen declared that if the Government is to enter into the field of business it should do so only on a strictly business and fair competitive basis. The basis the foundrymen had in mind is a system of cost accounting "and with a staff composed of men who have business experience as well as theoretical training."

## Damping Capacity of Steels

In THE IRON AGE of Nov. 24 and Dec. 29, 1932, there appeared an article, "Correlation of Damping Capacity of Steels with Other Properties," by G. R. Brophy, research laboratory, General Electric Co., Schenectady, N. Y. His experiments show that there is probably no general correlation of damping capacity with



Damping capacities of annealed bars at 450 deg. C. Correlation with creep.

other properties with the exception of creep. Several graphs were reproduced to illustrate this latter point of correlation with creep but through a misunderstanding one of the most important illustrations was omitted. The accompanying set of curves is herewith reproduced, at the suggestion of the author, because these more clearly reveal the correlation between damping capacity and creep.

## Tin Plate Imports Will Be Small This Year

Although 7247 gross tons of tin plate was imported into the United States in 1932, against 195 tons in 1931, according to Department of Commerce records, this year's imports are likely to be very much less than those of last year, THE IRON AGE is informed on reliable authority. At the present time probably not more than 10,000 base boxes of Welsh tin plate are on order for shipment to this country.

Reports in the tin plate trade recently that the California Packing Corp. had contracted for Welsh plate are declared to be without foundation. THE IRON AGE telegraphed to that company regarding such reports and received the following reply:

Answering your telegram Feb. 9, we have made arrangements for our requirements of tin cans to be manufactured from domestic tin plate.

CALIFORNIA PACKING CORP.

It is said that nearly all domestic users of tin plate, including those who buy cans and those who make their own cans, have refrained from buying Welsh plate this year, although such plate can be bought for delivery at certain points at considerably less than American plate. This is particularly true on the Pacific Coast.

The outlook for tin plate trade this year is regarded in well-informed circles as fairly good. The situation for the full year cannot be accurately appraised until more is known of the crop prospects, but there are some estimates that tin plate requirements may be 10 or 15 per cent larger than those of last year, when tin plate production declined relatively less than that of steel products in general.

"Symposium on Steel Castings," 254 pages, 6 x 9 in., profusely illustrated, is a comprehensive compilation of data and statistics of special significance to the steel casting industry. Much of the technical data have not been previously published, and a great deal have been concisely compiled from many published papers and reports. Copies of this book are available at \$1 each from American Society for Testing Materials, 1315 Spruce Street, Philadelphia, or from American Foundrymen's Association, 222 West Adams Street, Chicago.

## British Steel Output Gained in 1932

British trade in iron and steel for 1932 shows steel production increased, pig iron output only slightly lower, exports sustained and imports drastically reduced compared with 1931 levels, according to preliminary figures received in the Commerce Department's iron and steel division.

A total of 3,568,900 gross tons of pig iron was produced during 1932, a drop of only 191,200 tons, or about 5 per cent, compared with the previous years.

Steel output actually exceeded that of 1931 by 92,600 tons, or about 2 per cent, to aggregate 5,257,400 tons.

A loss of 92,043 tons was recorded in exports, bringing the total for this trade down to 1,888,574 tons.

The outstanding feature of the year's returns, however, was the very marked drop in the import trade, which registered a decline from 2,851,958 tons in 1931 to 1,592,243 tons in 1932, this drop amounting to 1,259,715 tons, or 43 per cent.

## Steel Furniture Orders in 1932

Business steel furniture orders in 1932 dropped to \$7,911,725 from \$14,903,422 in the previous year, according to reports received by the Bureau of the Census from 36 makers. Shelving steel furniture orders, reported by 16 manufacturers, declined to \$2,102,661 from \$4,446,584.

Business steel furniture orders last December totaled \$588,913 against \$577,053 in November. Shelving steel furniture orders last December totaled \$153,385 compared with \$138,559 in the preceding month.

## Steel Treathers Congress in Detroit Oct. 2-6

The board of directors of the American Society for Steel Treating has decided to hold the fifteenth annual National Metal Congress and Exposition in Detroit, Oct. 2 to 6, 1933. The Detroit Convention Hall, where the exposition was held in 1927, has been selected for the exhibits.

"Methods of Organizing and Conducting Industrial Safety Contests," a 20-page brochure published by the Policyholders Service Bureau, Metropolitan Life Insurance Co., 1 Madison Avenue, New York, deals with the practices of several industrial organizations in connection with the competitive phase of safety educational work. The report analyzes programs of representative industrial concerns with respect to organizing and conducting safety contests.

# ... LETTERS TO THE EDITOR ...

## Competition Needs Diet of Facts

Editor, THE IRON AGE:

YOUR recent editorial calling attention to the devastating tactics of some firms in quoting irrespective of cost contains a lot of good old-fashioned advice, and I have no doubt will produce much good result. I have no criticism to offer but venture to pursue the subject into a little more detail.

Business may be divided into two kinds: articles which are relatively standard, are made in large quantities and which have a market price; and articles or services which are special and have to be figured or estimated before they are quoted. It seems to me that the price situation is quite different on these two classes, as the latter depends on an estimate, while the former is backed by a definite experience.

In standard goods, the principles of scientific management relating to cost, and the principles of mass production relating to volume, have been pretty thoroughly tried out, and, while lower costs have been achieved by scientific management, much lower selling prices have been arrived at in the search for volume. A good many firms have not differentiated between volume gained at the expense of a competitor and volume due to increased consumer demand. The depression of the last three years has effectively disposed of both, with the result that many firms have a selling price representing little profit at high volume and representing a loss at any attainable volume.

If under these circumstances any firm in a standard business decides to take no orders that show a loss, they face these alternatives, either to cease doing business, or else to arbitrarily raise their prices higher than any their competitors are quoting. As he knows that his goods are worth as much and no more than those of his competitors he is making the assumption that they, requiring higher prices just as he requires them, will follow his lead. This assumption presupposes a unity of purpose, a community of economic ideas, and an intelligent selfishness which even present circumstances are not likely to generate spontaneously. It is also assuming that all or most of these competitors, even if they do raise their prices, will then be able to steadfastly ignore the assaults of the buyers and salesmen who feel that they have an interest in lower rather than higher prices. Most firms have more talent for being greedy on a small scale than for being intelligently selfish on a large scale, and the opportunity offered for aggression against

the business of the price raiser is a temptation hard to withstand. Of course, price rises do take place, but they are almost always dependent on a certain amount of economic instruction in the principles involved.

In special businesses the situation is even more vexing because of the added hazard of estimated costs. Test cases on such diverse things as printed matter, paper boxes, pressed metal or springs, if figured by a group of competitors, will show variations of 30 per cent or more in the face of general profits of not more than 5 per cent. In some trades 20 per cent is added to estimates to allow for errors in estimate, based on years of experience.

The net of this argument is that prices may be in the long run based on cost, but today they are based on competition. A great many costs are higher today than in 1929, due to the smaller volume available, and the selling prices are far lower. If this is so, is not the problem to regulate competition rather than to stress the importance of cost?

Regulation of competition does not mean suppressing it or abolishing it, but rather it means to give it a diet of facts for a few years, instead of letting it feed on fears, rumors, false ambitions, hasty decisions and the other indigestible foods that have nourished it in the past. Most industries are abysmally ignorant of the facts about themselves, nor have they any way of finding them out. Some of the facts every man should know are the following: Suppose the business man who reads this gives himself a New Year's examination in the following questions, and at the end grades himself according to the results obtained.

1. What is the volume of my industry in each of the last five years?
2. Is the industry growing or dying?
3. Is it holding its own proportionately to general business in comparable lines?
4. Is the line scientifically adapted to the needs of consumer, merchant, jobber or manufacturer?
5. Is the price structure well adapted to the circumstances?
6. What trade channels does the product move in?
7. What is the relative importance of each?
8. What is the trend in each?
9. What is my individual position in regard to the above eight questions?
10. Am I working on any method of solving these problems?
11. Can I adopt a scientific sales policy without this knowledge?
12. Are my competitors and myself versed in the necessities of the case, and have they sufficient facts for an accurate sales policy?
13. What is the effect on competition, if all firms in the trade base their acts on

ignorance of the basic conditions of the trade?

While hundreds of such questions can be asked and no answer be forthcoming, these are enough to illustrate what is meant by regulating competition. The first step is to lift it up from the status of a free-for-all fight in the dark, to an orderly process based on facts. Basing action on the facts corrects errors of fact. Beyond that a gain in economic knowledge will tend to reduce the number of errors of judgment, and beyond that a set of ideals pointing toward an orderly development of the industry will give each man the assurance that comes from a fixed goal and a studied route toward it.

The course of business in the years to come is going to require more knowledge, more planning, more skill and more work than ever before. To the few who are intelligent enough to use these weapons business will be more profitable than ever before, not only for the manufacturer, but for the merchant, and will produce greater utilities for the consumer. The rewards will come only to the few who are willing to do the work.

S. T. Hobbs

Worcester, Mass.

## Develops Process For Coloring Aluminum

A process for oxidizing and coloring aluminum and its alloys is now being marketed by the United States Research Corp., 40-35 Twenty-first Street, Long Island City, N. Y., under the name Coloral. The company claims economical and efficient reproducibility of Coloral in the plating shop, due to the fact that the details were worked out by the technical staff, which is headed by Dr. Colin G. Fink and L. C. Pan, noted electrochemists.

This process, it is claimed, has been in commercial use for about three years and has proved not only highly efficient, but extremely economical as well, due to the simplicity of the process. No special equipment is needed as the bath does not require either agitation or temperature control.

Other features claimed are as follows: The bath is permanently stable, and does not give off harmful sprays or fumes. The complete operating cycle for oxidizing and coloring is 30 min. or less and processed sheets can be stamped or formed without affecting the finish. The process can be applied to aluminum or its alloys in all forms, including sand and die castings and any color or color combinations can be applied with uniform results.

Shipments of T-rail trackwork for rails of 60 lb. and heavier in January were 1984 tons compared with 1845 tons in January, 1932.



# • EDITORIAL COMMENT •

## Compulsory Unemployment Insurance

**F**ORTY-FIVE State legislatures are convening early this year, and one of the first measures to be introduced in many of them will be a compulsory unemployment insurance bill. Such a bill

is now before the Ohio legislature, being a proposal framed by a Commission on Unemployment Insurance appointed some time ago by Governor White to study the question.

The Ohio Chamber of Commerce already has voiced vigorous opposition to the bill, listing 12 specific arguments against it. Among the more important and convincing arguments are the following: (1) no scheme of compulsory unemployment insurance has worked satisfactorily anywhere in the world; (2) its enactment would impose another serious burden on the recovery of business rather than be a factor in relieving the present depression; (3) it taxes the thrifty and steady employee for the support of the unthrifty and irregular employee; (4) it sets up a fund of partially frozen assets which cannot be drawn upon by workmen in case of sickness or used as a retirement fund for old age; (5) it would withdraw from the capital market of Ohio for investment in government securities approximately \$50,000,000 a year and thus deplete the reservoir of capital to be drawn on in financing industry and giving employment; (6) the liquidation in time of depression of the securities in which the huge unemployment insurance reserves would be invested would break the market and result in greater suffering and more unemployment.

Recognizing that mere destructive opposition may do more harm than good, the chamber declared that the establishment of voluntary unemployment reserves is now possible and could be made more effective by simple legislation that "would not do violence to the traditions of Ohio." We believe that therein lies the crux of the matter. A considerable part of the public is of the opinion that industry is committed to an active campaign of opposition to unemployment insurance and other social legislation, but that if and when such legislation is defeated, it will adopt a do-nothing policy. In support of this contention, they cite the fact that with few exceptions industry has done nothing toward setting up machinery to prevent a repetition of the present calamity.

That unemployment insurance adopted voluntarily by the individual employer is practical and can go a long way toward mitigating the effects of a business depression has been proved by the experience of such companies as the Leeds & Northrup Co. and the Geometric Tool Co. These companies have in operation a plan calling for the setting aside of a small percentage of the payroll in a special fund to be paid out to employees during times when they are involuntarily idle. In the case of the former company, the plan was inaugurated in 1923 and has been tested in the fire of the country's major depression.

One of the handicaps faced by the socially minded employer who would like to initiate movements of this

sort is the attitude of his competitors. Manufacturers who refrained from cutting wages two years ago were penalized by the cost differential established by those who did. Employers who maintained employment by building to stock faced and still confront the handicap established by competitors who hewed working hours to the strict line of current sales. In these troubled times, virtue is penalized rather than rewarded.

If unemployment insurance is desirable and inevitable, it should be spread evenly and removed as a factor of competition. It is hard to see how this could be done without legislation. On the other hand, the variegated hodgepodge of legislation that would come from independent action of State legislatures would not be a satisfactory answer.

There is good reason for individual employers, trade associations and local groups to study this question of unemployment insurance intensively and to formulate the essentials of a long-term program. Industry will then be in a better position to see to it that whatever legislation comes will not be ill advised and too hastily enacted.

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## Train Guns On Selling

**S**PEAKING at the annual meeting of the Steel Founders' Society of America, Inc., in Detroit, Granville P. Rogers, managing director, voiced the opinion that steel foundries must resight their guns on selling after having trained them the past year on cost reduction. He suggested that the time is at hand when those responsible for merchandising and selling should be put in command. The problem facing steel foundries (and for that matter, the entire metal-working industry) is not one of production, but of development of markets.

The company which hopes to get its share of business in 1933 should heed Mr. Rogers' advice. It should give major consideration not merely to selling its product, but to merchandising it intelligently.

Above all, this involves on the part of the sales staff a thorough knowledge of the customer's needs and how the company's product will best serve them. Never mind the details of how the product is made, or whether it has this or that feature. What the customer wants to know is what the product will accomplish for him if he uses it. That is the big merchandising job of which many companies lose sight, but which is the essence of selling success.

There is sound counsel, not only for the steel founder, but for all metal-working companies, in Mr. Rogers' statement, "Don't sell steel castings. Find the place where they can be used, and sell the service they can render under the conditions to which the machinery or product is to be subjected." Perhaps it is pertinent to remark that companies which have followed this formula seldom have found it necessary to resort to price-cutting to secure business.



# American Production of the Rustless Steels

By EDWIN F. CONE

ONLY in comparatively recent years have the rustless, or stainless, steels assumed industrial importance. First introduced as a cutlery steel a little over ten years ago, it was soon found that modifications were possible and that, as a result, industrial applications could be multiplied. There soon followed the low-carbon type which could be more readily rolled and fabricated, followed by the higher chrome compositions and the chrome irons. There were also developed the chrome-nickel combinations, the most familiar of which is the "18 and 8" type, and to these have been added other alloying elements.

The possible products of these general classes are almost as numerous as the possible combinations. Many types are now produced commercially which have found wide and indispensable application in industries where corrosion and heat resistance are prime considerations.

Interest in these alloy steels is very large, so much so that there is a keen demand for information as to the quantity made. THE IRON AGE has received many requests of this nature. Because of these facts it was decided to attempt a survey of the output of the producing companies. The results of this survey are presented in this brief article.

Most of the rustless steels are produced by companies which are the licensees of either the American Stainless Steel Co. of Pittsburgh, or the Krupp Nirossta Co. of Watervliet, N. Y. A list of these companies was obtained and they were solicited. Besides these there are a few other producers which do not operate under the

patents of these companies. These also were included.

The questionnaire requested data on the production of 18 and 8, the 12 to 14 per cent, and the 16 to 18 per cent chromium types and under "all other" those not included in these three classifications. Over 60 producing companies were canvassed, those making both ingots and castings. Excellent cooperation was experienced in most cases. The results of the canvass are presented in the table which covers 1929, 1930 and 1931, with 1932 estimated.

From the data it is evident that 1930 was the peak year with 44,156 tons of ingots and 3015 tons of castings. The effect of the depression is evident in the last two years. It is also plain that the commanding position is held by the 18 and 8 type which easily leads the others in tonnage each year. Ingots account for 91 per cent in 1932 to 94 per cent in 1930 of the totals.

Of particular interest is the information furnished by the American Stainless Steel Co., which gives the following data as to the approximate production, by its licensees, of "genuine stainless steel" for the four years in net tons:

1929.....	10,900
1930.....	8,500
1931.....	5,100
1932.....	3,800

These data are pointed out as "not including any tonnages of other corrosion resisting materials such as the 18 and 8 chrome-nickel group."

Because the replies to our survey do not include all companies, the totals in the table do not fairly represent the entire production for each year. Assuming that the totals obtained represent 90 per cent of the country's production of ingots and 75 per cent of castings, then the actual output of rustless steel would be estimated as follows:

	Ingots	Castings	Totals
1929	43,650	3,930	47,580
1930	49,060	4,020	53,080
1931	27,410	2,870	30,280
1932	21,280	2,490	23,770

It should be stated that these data do not include the production of rustless clad steels.

Using the data in the table, an interesting calculation is possible. From the production of alloy steel ingots and castings for 1929, 1930 and 1931, as compiled by the American Iron and Steel Institute, it is possible to figure the percentage which the rustless steels represent of these totals, as shown by the following table:

Year	Alloy Steel	Rustless Steel	Per Cent
1929	3,957,207	47,580	1.20
1930	2,443,311	53,080	2.17
1931	1,455,913	30,280	2.08

Thus in 1930 the rustless steel output was 2.17 per cent of the total alloy steel as contrasted with 2.08 per cent in 1931 and 1.20 per cent in 1929.

From these calculations an interesting deduction is possible. If the same approximate ratio held in 1932 which obtained in 1931 and 1930, then the rustless steel production last year was about 2.12 per cent of the total alloy steel. On the basis of an output of 23,770 tons of rustless steel in 1932, the approximate total alloy steel ingots and castings made last year would be 1,121,000 gross tons.

Although the depression has retarded the expansion of this new industry, it is probable that in a normal year the output will easily exceed that of 1930, the record thus far.

The annual spring meeting of the Electrochemical Society will be held at the Windsor Hotel, Montreal, Canada, on May 11, 12 and 13. The session on riday morning, May 12, will be devoted to papers on electric furnaces for steel, alloy and other electrothermic operations.

## PRODUCTION OF STAINLESS OR RUSTLESS STEEL IN THE UNITED STATES (Gross Tons)

	1929	1930	1931	1932*
<b>Ingots:</b>				
18 and 8.....	16,935	28,018	11,845	7,400
12 to 14 per cent Cr (approx.).....	11,694	7,088	4,353	2,330
16 to 18 per cent Cr (approx.).....	8,138	6,425	6,013	5,425
All other (Cr or Cr and Ni).....	2,370	2,244	1,959	3,465
Not allocated.....	150	381	500	530
<b>Total .....</b>	<b>39,287</b>	<b>44,156</b>	<b>24,670</b>	<b>19,150</b>
<b>Castings:</b>				
18 and 8.....	55	166	151	269
12 to 14 per cent Cr (approx.).....	10	10	20	15
16 to 18 per cent Cr (approx.).....	25	64	129	159
All other (Cr or Cr and Ni).....	1,925	2,099	1,515	1,232
Not allocated.....	934	676	342	191
<b>Total .....</b>	<b>2,949</b>	<b>3,015</b>	<b>2,157</b>	<b>1,866</b>
*Estimated.				
<b>Grand totals (ingots and castings).....</b>	<b>42,236</b>	<b>47,171</b>	<b>26,827</b>	<b>21,016</b>

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## SUMMARY OF THE WEEK'S BUSINESS

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# Miscellaneous Steel Business Gains; Ingot Output at 20 Per Cent

Chicago Mills Experience the Best Week's Business in Several Months  
—Increases Also at Pittsburgh and Cleveland

THE most definite improvement in steel business apart from automobile requirements thus far in the new year has developed within the past week. Moreover, there has been a loosening up of automobile tonnage with the release of steel for 10,000 cars by the Ford Motor Co. and the settlement of the strike at the body plant of the Hudson Motor Car Co., which had affected its entire works. Steel ingot output for the country has advanced to an average of 20 per cent.

Chicago mills have had the best week's business in several months, while inquiries have also gained, foreshadowing an early increase in ingot production, which remains this week at 18 per cent. Orders have gained moderately at Pittsburgh and Cleveland, and production has increased a point to 16 per cent at Pittsburgh and three points to 38 per cent at Cleveland. The Valley district is maintaining last week's rate of 20 per cent, while Wheeling output of raw steel is fully 35 per cent, being sustained largely by tin plate requirements which are responsible for the operation of one Bessemer plant in that district at about 70 per cent.

Elsewhere throughout the country there has been no marked change, but steel producers note some revival of confidence among their customers in anticipation of an early attack at Washington upon some of the pressing economic problems.

A considerable part of the gain in steel tonnage of the past week has been in bars, which normally take first position among all steel products in volume and in diversification of uses, though they were displaced last year by sheets. A consistent increase in bar orders would naturally reflect increasing activities among a wide range of consuming industries.

THE eight-day closing of all Michigan banks is not expected to have a serious effect on Detroit automobile companies, which are operating without interruptions beyond those caused by recent labor difficulties. The Ford Motor Co. is gradually increasing output, its immediate goal being the assembly of 1200 cars a day, with 1500 to be reached as soon as possible. Though Chevrolet is the largest user of steel in the automobile industry at present, its requirements for the quarter have been pretty well covered, so that most of the new business from Detroit during the next

month or so will come from the Ford company. The fact that January production and retail sales exceeded the totals of the same month last year is contributing to a more hopeful feeling in the automobile industry.

Railroads are doing very little steel buying, though some Western roads have contracted for a small amount of malleable castings in the Chicago district, thereby contributing to an increase in Chicago pig iron shipments, which are running about 20 per cent ahead of the January rate. Several roads are estimating rail requirements, with inquiries expected some time next month. The Erie will take 25,000 or 30,000 tons, and the Chesapeake & Ohio will buy a smaller tonnage.

While building construction makes a poor showing this week, with only 5900 tons of lettings of structural steel and 2500 tons in new projects, a fair volume of work is being figured, and mill rollings of steel awarded some time ago are a factor in the slowly expanding output of raw steel.

ALTHOUGH pig iron shipments are gaining at Chicago, there is not much change for the better in other districts. A merchant stack at Pittsburgh and one in the Valleys are scheduled to go out of blast this month, while in Alabama a merchant furnace has been blown in for a brief run.

Scrap markets show a firmer trend notwithstanding that consumer buying is insufficient to impart real strength.

Efforts are being made by some producers to check the weakness in prices of sheets and wire products. A Pittsburgh maker of wire products has announced an advance of \$1 a ton on nails, staples and galvanized barbed wire and has named a minimum of 2.10c. a lb. on plain wire, the published quotation of the past few weeks. Some makers of galvanized sheets are declining to take business at less than 2.60c. a lb., Pittsburgh, though recent sales have been at \$2 to \$4 a ton below that figure. An announcement of minimum prices on all grades of sheets is expected momentarily.

THE IRON AGE composite prices are unchanged this week at 1.923c. a lb. for finished steel, \$13.56 a gross ton for pig iron and \$6.83 a gross ton for heavy steel scrap.

# ▲▲▲ A Comparison of Prices ▲▲▲

Market Prices at Date, and One Week, One Month and One Year Previous  
Advances Over Past Week in Heavy Type, Declines in Italics

## Pig Iron

Per Gross Ton:

	Feb. 14, 1933	Feb. 7, 1933	Jan. 17, 1933	Feb. 16, 1932
No. 2 fdy., Philadelphia.....	\$13.34	\$13.34	\$13.34	\$15.64
No. 2, Valley furnace.....	14.50	14.50	14.50	15.00
No. 2 Southern, Cin'tl .....	13.82	13.82	13.82	13.82
No. 2 Birmingham .....	11.00	11.00	11.00	11.00
No. 2 foundry, Chicago* ..	15.50	15.50	15.50	16.50
Basic, del'd eastern Pa. ....	13.50	13.50	13.50	16.25
Basic, Valley furnace .....	13.50	13.50	13.50	14.50
Valley Bessemer, del'd Pitts-				
burgh .....	16.89	16.89	16.89	17.39
Malleable, Chicago* .....	15.50	15.50	15.50	16.50
Malleable, Valley .....	14.50	14.50	14.50	15.50
L. S. charcoal, Chicago .....	23.17	23.17	23.17	23.17
Ferromanganese, seab'd car-				
lots .....	68.00	68.00	68.00	75.00

\*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

## Rails, Billets, etc.

Per Gross Ton:

	Feb. 14, 1933	Feb. 7, 1933	Jan. 17, 1933	Feb. 16, 1932
Rails, heavy, at mill .....	\$40.00	\$40.00	\$40.00	\$43.00
Light rails at mill .....	30.00	30.00	30.00	34.00
Rerolling billets, Pittsburgh.	26.00	26.00	26.00	27.00
Sheet bars, Pittsburgh.....	26.00	26.00	26.00	26.00
Slabs, Pittsburgh.....	26.00	26.00	26.00	27.00
Forging billets, Pittsburgh...	31.00	31.00	31.00	33.00
Wire rods, Pittsburgh.....	35.00	35.00	35.00	37.00
	Cents	Cents	Cen's	Cents
Skelp, grvd. steel, P'gh, lb....	1.60	1.60	1.60	1.50

## Finished Steel

Per Lb. to Large Buyers:

	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	1.60	1.60	1.60	1.50
Bars, Chicago.....	1.70	1.70	1.70	1.60
Bars, Cleveland.....	1.65	1.65	1.65	1.55
Bars, New York.....	1.95	1.95	1.95	1.85
Tank plates, Pittsburgh.....	1.60	1.60	1.60	1.50
Tank plates, Chicago.....	1.70	1.70	1.70	1.60
Tank plates, New York.....	1.698	1.698	1.798	1.798
Structural shapes, Pittsburgh	1.60	1.60	1.60	1.50
Structural shapes, Chicago..	1.70	1.70	1.70	1.60
Structural shapes, New York	1.86775	1.86775	1.86775	1.76775
Cold-finished bars, Pittsburgh	1.70	1.70	1.70	2.00
Hot-rolled strips, Pittsburgh.	1.45	1.45	1.45	1.40
Cold-rolled strips, Pittsburgh.	1.80	1.80	1.90	1.90

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

## Finished Steel

Per Lb. to Large Buyers:

	Feb. 14, 1933	Feb. 7, 1933	Jan. 17, 1933	Feb. 16, 1932
Hot-rolled annealed sheets, No. 24, Pittsburgh.....	2.00	2.00	2.00	2.15
Hot-rolled annealed sheets, No. 24, Chicago dist. mill..	2.00	2.00	2.10	2.30
Sheets, galv., No. 24, P'gh..	2.50	2.50	2.65	2.75
Sheets, galv., No. 24, Chicago dist. mill.....	2.60	2.60	2.75	2.85
Hot-rolled sheets, No. 10, P'gh	1.45	1.45	1.45	1.60
Hot-rolled sheets, No. 10, Chicago dist. mill.....	1.55	1.55	1.55	1.70
Wire nails, Pittsburgh.....	1.80	1.80	1.80	1.95
Wire nails, Chicago dist. mill	1.85	1.85	1.85	2.00
Plain wire, Pittsburgh.....	2.10	2.10	2.10	2.20
Plain wire, Chicago dist. mill	2.15	2.15	2.15	2.25
Barbed wire, galv., P'gh....	2.60	2.60	2.60	2.60
Barbed wire, galv., Chicago dist. mill .....	2.65	2.65	2.65	2.65
Tin plate, 100 lb. box, P'gh..	\$4.25	\$4.25	\$4.25	\$4.75

## Old Material

Per Gross Ton:

	Feb. 14, 1933	Feb. 7, 1933	Jan. 17, 1933	Feb. 16, 1932
Heavy melting steel, P'gh...	\$8.50	\$8.50	\$8.25	\$10.25
Heavy melting steel, Phila...	6.75	6.75	6.75	7.37½
Heavy melting steel, Ch'go...	5.25	5.25	5.25	7.12½
Carwheels, Chicago.....	8.00	7.50	7.75	7.50
Carwheels, Philadelphia.....	8.00	8.00	8.00	10.50
No. 1 cast, Pittsburgh.....	9.00	9.00	9.00	9.75
No. 1 cast, Philadelphia.....	8.00	8.00	8.00	10.00
No. 1 cast, Ch'go (net ton)...	6.25	6.25	6.25	7.50
No. 1 RR. wrot., Phila.....	7.50	7.50	7.50	8.50
No. 1 RR. wrot., Ch'go (net)	4.50	4.50	4.50	6.50

## Coke, Connellsville

Per Net Ton at Oven:

	Feb. 14, 1933	Feb. 7, 1933	Jan. 17, 1933	Feb. 16, 1932
Furnace coke, prompt.....	\$1.75	\$1.75	\$1.75	\$2.25
Foundry coke, prompt.....	2.50	2.50	2.50	3.50

## Metals

Per Lb. to Large Buyers:

	Cents	Cents	Cents	Cents
Lake copper, New York.....	5.00	5.00	5.00	6.62½
Electrolytic copper, refinery..	4.75	4.75	4.75	6.00
Tin (Straits), New York....	23.60	23.70	22.70	22.15
Zinc, East St. Louis.....	2.65	2.75	3.00	2.82½
Zinc, New York.....	3.02	3.12	3.37	3.19½
Lead, St. Louis.....	2.87½	2.87½	2.87½	3.55
Lead, New York.....	3.00	3.00	3.00	3.75
Antimony (Asiatic), N. Y...	5.75	5.75	6.00	6.50

# ▲▲▲ The Iron Age Composite Prices ▲▲▲

## Finished Steel

Feb. 7, 1933  
One week ago  
One month ago  
One year ago

1.923c. a Lb.  
1.923c.  
1.936c.  
1.926c.

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot rolled strip. These products make 85 per cent of the United States output.

	HIGH	LOW
1932 .....	1.977c., Oct. 4;	1.926c., Feb. 2
1931 .....	2.037c., Jan. 13;	1.945c., Dec. 29
1930 .....	2.273c., Jan. 7;	2.018c., Dec. 9
1929 .....	2.317c., April 2;	2.273c., Oct. 29
1928 .....	2.286c., Dec. 11;	2.217c., July 17
1927 .....	2.402c., Jan. 4;	2.212c., Nov. 1

## Pig Iron

\$13.56 a Gross Ton  
13.56  
13.56  
14.47

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	HIGH	LOW
1932 .....	\$14.81, Jan. 5;	\$13.56, Dec. 6
1931 .....	15.90, Jan. 6;	14.79, Dec. 15
1930 .....	18.21, Jan. 7;	15.90, Dec. 16
1929 .....	18.71, May 14;	18.21, Dec. 17
1928 .....	18.59, Nov. 27;	17.04, July 24
1927 .....	19.71, Jan. 4;	17.54, Nov. 1

## Steel Scrap

\$6.83 a Gross Ton  
6.83  
6.83  
8.25

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	HIGH	LOW
1932 .....	\$8.50, Jan. 12;	\$6.42, July 5
1931 .....	11.33, Jan. 6;	8.50, Dec. 29
1930 .....	15.00, Feb. 18;	11.25, Dec. 9
1929 .....	17.58, Jan. 29;	14.08, Dec. 3
1928 .....	16.50, Dec. 31;	13.08, July 2
1927 .....	15.25, Jan. 11;	13.08, Nov. 22



# Pittsburgh Experiences Rise In Orders and Operations

February Business Running Slightly Ahead of That of January—  
Output Up to 16 Per Cent

PITTSBURGH, Feb. 14—Orders for finished steel have been slightly heavier in this district during the past week, and aggregate tonnage in the first half of the month shows a moderate improvement over that of January. Buying by the automotive industry is fairly well sustained, and resumption of releases by the Ford Motor Co. promises to offset possible declines from other sources in the next two weeks. Railroad buying is still lacking, but structural steel inquiry is expanding, and miscellaneous small awards make a fairly satisfactory total. Demand for pipe is very light.

Steel ingot production in the district is slightly heavier, being estimated this week at 16 per cent of capacity. One of the larger interests is running at 17 per cent, but three or four of the district's principal plants remain entirely idle. In the Valleys and nearby northern Ohio mills, production continues at about 20 per cent of capacity, while the Wheeling district is engaged at at least 35 per cent. A large Bessemer plant in the last-named territory, supplying nearby tin mills, is engaged at at least twice this rate.

Finishing mill schedules are generally holding their own, with a slight increase in production of plates and shapes. Bar mills are also engaged at a slightly higher rate in both the Pittsburgh and Valley districts.

The recent downward trend in prices seems to have been checked, although quotations on some grades of sheets are rather indefinite. An advance in asking prices is expected in the near future. A leading producer has issued new schedules on wire products, with advances of \$1 a ton on nails, barbed wire and staples. The 1.60c., Pittsburgh, price on bars, plates and shapes applies on recent small orders. However, concessions continue on attractive tonnages. The semi-finished market is quotably unchanged, but consumers have done no recent buying.

## Pig Iron

Shipments this month show no improvement over those of January, and consumers are pursuing their usual policy of buying only for immediate consumption. As many foundries are entirely inactive, the volume of business is very small. The prices are tested only by small-lot orders and are holding in the immediate district except when outside competition is encountered. The local merchant furnace and a merchant stack in the

Valleys are scheduled to go out of blast during the month.

## Semi-Finished Steel

Sales of billets, slabs and sheet bars at less than \$26, Pittsburgh, have not been definitely reported, although one consumer is said to have had a quotation of \$24.50 on sheet bars. Apparently no order resulted. Forging billets are quoted at \$31, and wire rods at \$35, Pittsburgh or Cleveland.

## Rails and Track Accessories

This market continues very quiet, with rail inquiry from leading carriers still postponed. The Erie is expected to enter the market for a fair-sized tonnage of rails in the near future, and the New York Central may soon follow. Most of the railroads have established fairly large theoretical requirements for the year, but few of them can be expected to place orders for this much tonnage.

## Bolts, Nuts and Rivets

Demand is holding up fairly well, but has not increased over January levels. Mills in the district are running at about 15 per cent of capacity. Prices are fairly well held.

## Warehouse Business

Local jobbers have revised quotations on galvanized, hot-rolled annealed and hot rolled and annealed sheets to conform to the recent reduction in mill prices. Otherwise quotations out of warehouse are unchanged, wire and nail prices having been marked down several weeks ago. Volume is holding at about the rate which prevailed in January.

## Bars, Plates and Shapes

Estimating departments in local fabricating shops are fairly busy, and considerably more work is said to be in the formative stage, with the prospect of improved tonnage in the spring. Structural and reinforcing bar awards in the Pittsburgh district are very light. Demand for plates, which has been somewhat more active in the last two weeks, is holding up fairly well. A fair volume of business in oil storage tanks is before the trade. Merchant bars are very quiet, with manufacturing consumers generally confining their purchases to a minimum. Alloy steel bars are moving to the automotive industry in unchanged volume.

Mills continue to quote bars, plates and shapes at 1.60c., Pittsburgh, and can point to a fair volume of small orders taken at this figure. On

larger tonnages quotations are not so clearly defined.

## Cold-Finished Steel Bars

Most producers report an increase in their tonnage this month as compared with January, with the automotive industry continuing as the leading buyer. Prices are well held at 1.70c. base, Pittsburgh.

## Tubular Goods

Movement of pipe to the oil fields is not as heavy this month as it was in January. The other lines are very dull, particularly lap and butt-weld material. The gasoline carrying line for the Pure Oil Co. to extend from Toledo refineries to Detroit, which was not placed last fall as originally planned, is expected to come out again about April 1. No other large line pipe projects are before the trade. The base discounts on most forms of pipe are fairly well held.

## Wire Products

The Pittsburgh Steel Co. has issued new schedules of prices on wire products, calling for an advance of 5c. per 100 lb. on nails, staples and galvanized barbed wire. Other makers are expected to meet this advance, which makes the quoted price on nails \$1.85 a keg in carloads. Revisions have also been made in quantity extras for pool carloads and less than carload lots, which are now 20c. and 30c. a 100 lb. respectively, as compared to 25c. and 40c. previously. The premium on mixed carloads is unchanged at 10c. a 100 lb., with a discount of 10 per cent on extras. On joint carloads the same premium is charged without the discount on extras. The extra for galvanizing on merchant wire products remains unchanged at \$1.50 per 100 lb. Certain revisions have also been made in spring wire extras, although the base price continues at 3.10c., Pittsburgh. Manufacturers' wire is also unchanged at 2.10c., Pittsburgh, while fencing continues at \$50 a net ton for the No. 9 gage, with the above extras on smaller lots applying.

## Sheets

Tonnage has held up fairly well in the last week, with demand well distributed among the various consuming groups. The automobile industry continues to be an important consumer, and some companies expect to ship more sheets to the Detroit territory this month than they did in January. The sheet industry continues to operate at about 18 per cent of capacity. The recent decline in prices seems to have been checked, although the market is still ragged on some products. It is believed that an advance will be announced in the near future, which will be calculated to get back some of the ground lost in the recent decline.

## Tin Plate

Specifications have held up in the last week, and production continues

at well over 45 per cent of capacity. Only a few companies are under this rate, and some are doing considerably better.

### Strip Steel

Some producers report a slight improvement in demand. Increased releases from the Ford Motor Co. are helping aggregate business considerably. The other automotive makers are taking about as much steel as they did in January, but demand from miscellaneous manufacturing consumers of strip is very light. Hot-rolled strip is holding at 1.45c., Pittsburgh, and cold-rolled is quotable at 1.80c. to 2c.

### Coke and Coal

Heating coke has been extremely active in the last week, but the other grades are still very quiet. Domestic coal is also moving very well, and prices have firmed up in the last week. Consumption of coal by the railroads and large industries in the district has not materially changed.

### Scrap

The market has retained its recent strength in spite of the lack of important activity. A sale of about 1500 tons of No. 1 heavy melting steel at \$8.50 is representative of this grade, while railroad steel continues to command a premium. Sales of railroad grade into consumption at better than \$9 have been reported. In spite of the strength in high-grade material, dealers are able to pick up some No. 1 scrap at \$8, but are offering as much as \$8.50 to cover at one point. Under the circumstances, last week's range of \$8 to \$9 on No. 1 steel is still applicable. No additional activity is reported in the cheaper grades, but both No. 2 steel and machine shop turnings are strong in the absence of supplies. The other grades of scrap are unchanged.

## Philadelphia Opposed to Intercoastal Rate Move

Emphatic opposition to the proposal of carriers to apply export rates on iron and steel articles for intercoastal movement has been made by the joint executive transportation committee of Philadelphia commercial organizations. The committee filed a brief to this effect with railroad organizations in Official Classification territory. It is signed by Phillip H. Gadsden, president of the Chamber of Commerce and chairman of the joint committee.

The committee said "that if the rail lines are convinced that a downward revision of rates is necessary on iron and steel articles for intercoastal movement, we urge that the present proposal be withdrawn . . . and that a conference be arranged for the purpose of determining a more equitable basis which will be acceptable to all interests."

## British Steel Outlook Improving; Continental Markets Stronger

LONDON, ENGLAND, Feb. 13 (*By Cable*).—The steel outlook has improved following naval contracts, but present orders are insufficient to keep mills going regularly. Inquiry is more promising. Welsh tin plate business is quiet, but inquiry is expanding.

The British Steel Export Association is negotiating to barter steel for Russian iron ore.

January exports of pig iron from the United Kingdom were 6600 tons of which only 50 tons was shipped to the United States. Total exports of iron and steel last month were 148,000 tons.

Continental steel is stronger on Raw Steel Cartel developments. This cartel will adopt as a quota the production of the first half of 1932. Clabecq is still holding up a definite Belgian agreement and is insisting on simultaneous establishment of plate sales offices. It is expected that Continental steel producers will soon open sales offices for semi-finished steel and joists.

Japanese buying of Continental steel has been resumed. Continental sheet bars have been sold at £2 5s., gold, f.o.b.

The Italian iron and wire cartels have been resumed for another year.

### British Prices, f.o.b. United Kingdom Ports

Per Gross Ton

Ferromanganese, export .....	£9		
Billets, open-hearth .....	£4 17s.	6d. to	£5 7s. 6d.
Black sheets, Japanese specifications .....	£11		
Tin plate, per base box .....	15s.	9d. to	16s.
Steel bars, open-hearth .....	£7 17½s.	to	£8 7½s.
Beams, open-hrth. .....	£7 7½s.	to	£7 17½s.
Channels, open-hearth .....	£7 12½s.	to	£8 2½s.
Angles, open-hearth .....	£7 7½s.	to	£7 17½s.
Black sheets, No. 24 gage .....	£8 10s.		
Galvanized sheets, No. 24 gage .....	£10 10s.	to	£10 15s.

### Continental Prices f.o.b. Continental Ports

Per Metric Ton, Gold £ at \$4.86

Billets, Thomas ..	£2 4s.		
Wire rods, No. 5 B.W.G. ....	£4 10s.		
Black sheets, No. 31 gage, Japanese .....	£11 5s.		
Steel bars, merchant .....	£2 10s.		
Beams, Thomas ..	£2 5s.		
Angles, Thomas, 4-in. and larger ..	£2 10s.		
Angles, small ..	£2 12s.		
Hoops and strip steel over 6-in. base .....	£3 10s.		
Wire plain, No. 8 ..	£5 7s.	6d.	
Wire nail .....	£5 15s.		
Wire, barbed, 4-pt. No. 10 B.W.G. ..	£3 15s.		

Polish steel works have booked 35,000 tons of rolled steel for Russia on 18 months' credit, with part payment to be made in furs and fish.

## St. Louis Pig Iron Melt Showing an Increase

ST. LOUIS, Feb. 14—Melt of foundry pig iron during February has shown some increase, although it has not been sufficient to stimulate buying to any extent. Some of the jobbing foundries in St. Louis are enjoying a much better business than in January, and there has been a greater demand for stove castings. Prices are unchanged.

### Steel

A letting of highways and bridges scheduled by the Missouri Highway Commission for Feb. 17 has been indefinitely postponed. The price situation as to plates, shapes and bars seems to be stronger, and yet the new tonnage being offered is too small for a fair test. The market for wire products is firmer, although there has been no increase in the demand.

### Scrap

The Missouri Pacific has changed from carloads to tonnages in listing its scrap for sale, at the request of dealers, and its first list under the new plan offers 7800 tons. Other lists follow: Wabash, 514 tons of 52, 59 and 63-lb. rails, and New York, Chicago & St. Louis, 13 carloads. The market is inactive, and prices nominally unchanged.

## Newburgh Steel Works Not to Be Dismantled

The Newburgh steel works of American Steel & Wire Co., at Cleveland, will not be dismantled, according to announcement made by Myron C. Taylor, chairman of the board of the United States Steel Corp., to a Cleveland committee that urged that the operation of these works be continued. However, future operations of the Newburgh plant will depend on the demand for steel.

## Detroit Scrap Dull

DETROIT, Feb. 14—The local scrap market continues listless, although prices are steady and unchanged. Little automotive scrap is being produced except by the Chevrolet Motor Co. The district steel plant is taking in small tonnages on current contracts.



# Chicago Steel Business Gains To the Best in Months

While Ingot Output Remains at 18 Per Cent of Capacity, an Increase in the Near Future is Expected

CHICAGO, Feb. 14—Ingot output remains at 18 per cent of capacity, but new sales and inquiries indicate that the rate may be raised in the near future. Both sales and specifications for finished steel are the best in several months and easily make this the best week so far this year. The bulk of the tonnage is for bar mill products and reflects not only more liberal releases by some of the automobile manufacturers, but also there is a better spread of orders from general lines.

Tractor plants continue to push production schedules up slowly, but there is as yet no awakening by the farm implement builders. A small amount of railroad bridge work and a more active demand for malleable castings by the railroads are encouraging factors. The rail situation offers little beyond the belief by sellers that March will find inquiries placed in their hands.

The scrap market is quiet, not having the ability to snap back after heavy snow and severe cold had seriously hampered loading and preparation.

Price levels are much the same as in the early part of the month. Some sellers are taking a firmer stand on such commodities as wire products and cold-rolled strip. On the other hand, galvanized sheets are weak in the South and Southwest.

## Pig Iron

February shipments are running about 20 per cent ahead of the January rate, but new buying does not show a corresponding pick-up. New inquiries are at the level of recent weeks. It is significant that foundries in Chicago are beginning to run heavier melts, thereby following the lead that has recently been noted in rural areas. Several malleable shops have more railroad business, and tractors and automobiles are helping to support the slow advance of pig iron use. Considerable experimental work is being done on high-test iron for automobile crankshafts. It is said this is essentially a pig iron product, scrap in the melt introducing uncertainties that cannot be tolerated.

## Bolts, Nuts and Rivets

Shipments show some improvement, and inquiries, many of which are rather indefinite in character, are more numerous. Sales are lagging. Jobbers are giving little support to the market.

## Reinforcing Bars

Awards are small except for a dam at Alma, Wis., which calls for 350 tons.

Public work of attractive size now before the trade includes the St. Paul post office, 500 tons, and miscellaneous buildings at flying fields in Illinois and Michigan. The new State Highway Commission of Illinois has rejected a number of bids that had not been acted upon by the old administration. It is expected these will be readvertised at an early date. Prices are weak as tested by the Alma dam.

## Cast Iron Pipe

Plans for the Chicago pumping station, which will require a large tonnage of pipe, will not be ready for about 30 days. Although some contracts have been let for the water plant at Wilmette, Ill., there have been no orders placed for materials and equipment. Between 25 and 30 projects are being talked about, but they cannot go ahead without Government funds which have not yet been obtained.

## Rails and Track Supplies

The rail market remains quiet. Only one mill is producing. Sellers are now setting March as the time when inquiries will make their appearance. It is generally agreed that tonnages will be light, but in all probability they will more nearly represent actual requirements than has been the case in recent years when large carryover tonnages upset calculations. Track accessories are moving steadily notwithstanding the recent heavy snow storm and cold weather, which temporarily put an end to most track work in the Middle West.

## Bars

The major part of new tonnage reaching local mills is for bar mill products. The best support is coming from automobile manufacturers, but consumers in miscellaneous lines are now taking more steel. Tractor builders who can meet the requirements of various industries are doing better, but farm implement makers do not seem to be able to make headway. It is interesting to note that some users have recently come into the market for the first time in several months. Chevrolet is stepping up its acceptances of steel.

## Structural Material

Fabricators are rather generally agreed that this market is as dull as at any time within their memories. Bids are being taken on some Government work on the upper Mississippi

River and more of this kind of work will be out for figures in the near future. The Burlington has ordered steel for a bridge in Nebraska and will take a small tonnage for bridge repair work in Illinois.

## Cold-Rolled Strips

Output is about 19 per cent of capacity and it may advance above that figure under the influence of Ford production. Although there have been some soft spots, prices are generally quotable at 1.90c. to 2c. a lb., Pittsburgh and Cleveland, or 2.20c. to 2.30c. delivered Chicago.

## Plates

Only a few small plate orders have reached local mills in recent days. There is still some talk concerning the probable need for oil storage tanks and mills are of the opinion that work of this kind will develop. Demand from railroad shops is small but comparatively steady. A Louisville, Ky., fabricator is low bidder on a water tank and tower for Hartland, Wis.

## Sheets

There are still some soft spots notwithstanding the efforts of several producers to peg prices. Competition is severe in the South and Southwest, where winter is waning and outdoor work calls for greater use of galvanized sheets. The roofing industry should be able to test its market in the North in the next week or two.

## Wire Products

Orders for the first half of February correspond closely to the volume in the first half of January. Should this pace be maintained, the tonnage on a daily basis in February will show improvement over the previous month for the reason that the present month is short and it also contains two holidays. Output of wire products ranges from 20 to 25 per cent of capacity. Demand from jobbers is climbing ahead of dealers' requirements. The reason for this situation appears to be that dealers will order only from hand to mouth, their credit is quite often poor and after all they are quite willing that the jobber should carry the stocks.

## Scrap

Snow and severe cold weather deadened the scrap market last week and it has not yet recovered to any extent. The fact that mill operations have not gained recently may explain why there has been no rush to get scrap as soon as the storm would permit. In general, prices are nominal, a few adjustments representing changes on several grades in order to bring them into relation with the remainder of the market. Railroad offerings in Chicago are very light. The Santa Fe is selling a small lot here and there, but still holds the bulk of recent accumulations.

# Eastern Pennsylvania Trade Still Extremely Light

Efforts Being Made to Stabilize Prices—Ingot Output of District  
Not Above 11 Per Cent

**P**HILADELPHIA, Feb. 14—Further efforts to stabilize the market are not proving wholly effective. Though there is a firmer tendency, irregularity persists. This is especially noticeable in sheets and plates. Concessions below the regular market are prevalent. Some mills report that it is almost impossible to size up the market because of quick shifts in quotations and their varying character.

New business is extremely light. The Reading Railroad has bought a small tonnage of plates for car repair work. It has not as yet, however, definitely determined upon an enlarged program of this kind.

Operations of steel works remain at a bare 11 per cent of capacity. A nearby plant put a 12-in. bar mill into operation today.

## Pig Iron

Denial has been made by a Coatesville, Pa., melter and by importers that the former has purchased 25,000 tons of Indian basic pig iron. The transaction had been reported by several sources in the trade and was accepted as being authentic. A nearby consumer is reported to have purchased 6000 tons of gray forge iron. A slight increase in inquiries has developed the past week, most of them for carlots. The domestic market still is quoted at \$12.50, furnace, for No. 2 plain foundry iron and \$13.50, delivered, eastern Pennsylvania, for basic iron.

## Plates, Shapes and Bars

Buying of heavy rolled material is extremely limited. Plates continue to show weakness and irregularity in price. While the range is now given as 1.50c. to 1.60c., Coatesville, on plates, it is reported that on the larger quantities the former level has been shaded. Some makers, however, are holding to the 1.50c. quotations and are successful in getting orders. The McClintic-Marshall Corp. has taken 1700 tons of steel for molasses tanks for the Pennsylvania Sugar Co. The Kalman Steel Corp. has taken 200 tons of reinforcing bars for the same company.

## Sheets

Makers are still trying to stabilize sheet prices, but concessions are reported to continue to prevail. The price of 2.60c., Pittsburgh, was announced last week on galvanized sheets No. 24, but the market is said to be irregular, though some makers are

holding to this level. Usual quotations are 2c. for No. 24 black sheets; 1.55c. to 1.70c. for hot-rolled annealed No. 10, the former for sizes up to 48 in. wide and the latter for greater widths. Hot-rolled strip is said to be softer. The regular quotation is 1.45c., Pittsburgh. There have been some fair-sized releases of cold-rolled sheets by automobile body builders the past week. This grade takes a range of 2.25c. to 2.30c., Pittsburgh.

## Imports

The following iron and steel imports were received here last week: 100 tons of pig iron from Scotland and 20 tons of band steel from Germany.

## Scrap

A nearby mill has purchased a small lot of stove plate and No. 2 cast scrap at approximately \$5.50 and \$6.50 respectively. Stove plate has declined 50c. a ton and is now quoted at \$5.50 to \$6. A shipment of No. 2 heavy melting steel will be loaded in a few days at Baltimore for exportation to Italy. The material will be carried in the ship which was loaded last week at Philadelphia with a shipment of No. 2 material, also for Italy.

## Birmingham Pig Iron Buying Fails to Gain

**B**IRMINGHAM, Feb. 14—Pig iron consumption continues to drag. Most foundries are still faced with an uncertain outlook. Prospects for cast iron pipe are moderately better. The condition of the pig iron market is controlled almost entirely by pipe requirements. During the present week several projects, requiring in excess of 1000 tons each, are up for bids.

Furnace operations were increased last week for the first time since the end of the year. Woodward Iron Co. placed its No. 3 stack in blast on Feb. 8, having had it banked since Dec. 15. The status of its No. 2 furnace, which was also banked on Dec. 15, is unchanged. Resumption by Woodward Iron Co. is due to exhaustion of several grades and it is probable that the stack will work only for about three weeks. This additional furnace increases Alabama's total to three, one of which is on basic and two on foundry.

Market quotations are being main-

tained at \$11 for the Southern market.

## Steel

For two weeks the bookings of the two manufacturers of steel in this district have shown some gains over previous weeks. The market is still far from active and the new business, which is mostly of a routine character, is attributable largely to deficiencies that grew in December and January rather than to any definite upward trend in demand.

The rail mill of the Tennessee Coal, Iron & Railroad Co. will roll about 3000 tons of rail this week, resuming after a week's operation and a week's idleness. There is still no prospect of any kind of a regular schedule at this time for the rail mill.

Nail prices are up 5c. a keg, with a new base of \$2 a keg in straight cars, Birmingham. Sheet prices are steadier.

Seven open-hearths were active last week and the same number are working again this week.

## Buffalo Pig Iron Inquiry is Slightly Better

**B**UFFALO, Feb. 14—Pig iron inquiry is a shade better and the melt seems to have improved in spots. There are a few inquiries for 100-ton lots. Very little Buffalo pig iron is being shipped to seaboard.

## Steel

It appears probable that the present operation of four open-hearths at the Lackawanna plant of the Bethlehem Steel Corp. will be continued the remainder of this month. Republic Steel Corp. charged two open-hearths Saturday to continue this week. Wickwire Spencer is operating one open-hearth. The general contract for the Biggs Memorial Hospital at Ithaca, N. Y., has been awarded to the John Johnson Construction Co., Buffalo. The steel has not yet been awarded.

## Scrap

It is understood that a sale of a small tonnage of low phosphorous plate scrap to a nearby Buffalo point was made at \$10, delivered. The effect of the strengthening of the Pittsburgh market, where \$8.50 is being offered for delivery of new bundles for Steubenville, Ohio, is to strengthen the local market, as under these conditions no steel can be brought to Buffalo from outside.

Scullin Steel Co., St. Louis, has developed a new type of locomotive wheel made of two disks, hollow within, yet, it is claimed, stronger and lighter than the old-fashioned spoke wheel. The counterbalance is cast of lead inside the disks.



# Cleveland Steel Orders Gain; Ingot Output Rises Slightly

Miscellaneous Business in Small Lots Shows Moderate Uptrend—  
Some Ford Specifications Still Suspended

CLEVELAND, Feb. 14—Demand for finished steel in the heavier rolled materials showed a moderate gain the past week, and indications are that February tonnage will be larger than that entered in January. Miscellaneous orders from manufacturing consumers have been slightly better in volume, although the size of orders has not increased.

While liberal releases for sheets and strip steel for Chevrolet cars are still being issued, not much new business came from the automotive industry the past week, and the demand from that source is still being affected by labor troubles in Detroit, which is indicated by the holding back of Ford specifications.

Steel ingot production in Cleveland increased three points to 38 per cent of capacity this week by the starting up of another open-hearth furnace by the Otis Steel Co.

Railroads in this territory are definitely lining up their rail requirements for 1933. The Erie Railroad is expected to purchase 25,000 to 30,000 tons and will have its inquiry out shortly. The Chesapeake & Ohio, which probably will buy a somewhat smaller tonnage, will not be in the market until around April 1.

Conneaut, Ohio, will inquire for 7000 ft. of 12 and 16-in. pipe, either steel or cast iron, and an elevated tank, and a little later will inquire for 3000 ft. of 24-in. pipe.

The only definite development in the price situation is a 5c. advance on nails to \$1.85 per keg over the recent commonly quoted price. Manufacturers' wire has been officially established at 2.10c. Weakness in sheet prices continues, although there has been no further decline in minimum quotations.

## Pig Iron

Sales and shipments so far this month have been in about the same volume as in the corresponding period of January. Demand is confined to very small lots, although a Muncie, Ind., consumer has taken quotations on 200 tons. While not much iron is going to the motor car industry, there have been some releases from foundries making castings for the Ford Motor Co. Little activity is shown by other industries. Some foundries in this territory are using 100 per cent scrap and several jobbing foundries have fitted up temporary small cupolas as a means of reducing costs while operating at very small capacity. Prices are unchanged.

## Wire Products

Efforts to stabilize nail prices at higher levels have led to formal announcement by some makers of the establishment of \$1.85 per keg, Cleveland and Pittsburgh. While \$1.80 has been commonly quoted for a few weeks, this price is reported to have been shaded 10c. An extra of 30c. applies to less than car lots and of 20c. for pool carloads. Polished staples are quoted at \$2.55 and galvanized at \$2.80; manufacturers' wire at 2.10c.; wire rods at \$35 and bale ties at \$43 under the new schedules. The prices are to remain in effect until April 1. Most nail buyers covered at the recent low prices.

## Sheets

New business and specifications were very light last week. Steel barrel manufacturers report better inquiry for barrels, which should be reflected later in an improved demand for sheets from that source. Enameling sheets are moving fairly well with some makers. Prices are still weak and irregular, although the low quotations are not being met by some producers and there has been no further decline in the minimum prices. On No. 24 hot-rolled annealed sheets 2c. has become more common. Some effort is being made to stiffen galvanized sheets to a 2.60c. minimum.

## Strip Steel

Some of the automobile plants that have been under good production have issued March releases, but these are lighter than for the current month. New demand is slow. Cold-rolled strip is unchanged at 1.80c. to 2c., Cleveland, although 1.90c. is usually the

minimum except to the larger consumers in the automotive field. Hot-rolled strip remains firm at 1.45c., Pittsburgh.

## Bars, Plates and Shapes

Some good shape tonnage is pending for work recently awarded, but there is no new inquiry in the construction field. Highway projects in Ohio are at a standstill pending decision by the State as to whether to use funds for direct relief or public work. Bars are dull, with little business from the automotive industry. Orders are confined to small lots from miscellaneous users. Plate orders are scarce. Prices are firm.

## Bolts and Nuts

Orders for bolts and nuts show a slight improvement over those of January. Demand from the automotive industry is holding up to recent volume and there is a slight increase in business from railroads. Specifications covering cut and rolled thread bolts have been adopted by the American Institute of Bolt, Nut and Rivet Manufacturers to clarify the difference between the two types of bolts and to assure proper labeling by manufacturers. These specifications provide that bolts sold or labeled as cut thread shall have full size shanks with finished points and those sold or labeled as rolled thread shall have scant shanks and are not to be pointed.

## Scrap

Purchases by consumers are of a hand-to-mouth character. There is some demand for borings and turnings for Youngstown delivery, for which dealers are paying \$5. There is no new local demand. Prices are fairly steady.

## Pig Iron Inactive in New England

BOSTON, Feb. 14—Little pig iron is moving in New England. Sales the past week included a car each of Indian No. 1 and No. 2 iron, a small amount of Buffalo iron and a limited number of truck loads of other brands. In the absence of any important business there is little opportunity for prices to change. It now develops that eastern Pennsylvania iron was sold to a Providence, R. I., melter for \$15.50 a ton, delivered. The sale was not made from Buffalo, as previously reported. There is no prospective pig iron business.

Demand for scrap is largely confined to a Chelsea, Mass., concern. There is a call for chemical borings and No. 1 heavy melting steel, but dealers will not dispose of holdings at prevailing prices and other interests have almost nothing on hand. The Chelsea firm is about to load 3000 tons of scrap for Danzig, and is making another barge shipment to Philadelphia. Negotiations for further export business are under way.

## Imports in 1932 of Pig Iron by Ports of Entry

(Gross Tons)	
Philadelphia .....	*85,514
Massachusetts .....	11,619
Rhode Island .....	8,060
Connecticut .....	7,761
Maryland .....	6,324
New York .....	4,330
Los Angeles .....	1,940
San Francisco .....	1,783
Chicago .....	1,630
Washington .....	459
Buffalo .....	413
Galveston .....	387
Hawaii .....	102
New Orleans .....	100
Virginia .....	98
Michigan .....	70
Porto Rico .....	40
Total .....	130,630

\*65.4 per cent of total.

# New York Steel Business Shows Spotty Improvement

A Few Companies Gain Volume While Others Do Not—Price Irregularities Continue in Some Lines

NEW YORK, Feb. 14—Some steel company sales offices in New York have experienced a gain in business thus far in February over the January average, while others have made no further headway or have suffered losses as compared with January.

Developments in the price situation have included an advance to 2.60c. a lb., Pittsburgh, on galvanized sheets, and an effort to prevent further declines in other sheet mill products, and an advance of \$1 a ton on some wire products. These price advances, while taking effect immediately, will not apply to much tonnage shipped during the first quarter, as most consumers and distributors contracted at the recent lower levels.

Two small tin plate mills have been making rather sharp competition for the larger producers, having quoted prices as low as \$3.75 per base box, Pittsburgh. Irregularities persist in the pipe trade, but the large producers, though disturbed by concessions amounting to several dollars a ton, are not attempting to meet this competition.

## Pig Iron

The week was bare of important developments. Aggregate bookings for the week rose slightly to 800 tons from 600 tons in each of the two preceding weeks. Open inquiry is still meager. With carlot buying ruling in the metropolitan district, competition here is somewhat easier. Most spot orders are being placed with domestic furnaces at prevailing quotations, which are unchanged at \$14, base, furnace, at Buffalo and \$12.50, base, eastern Pennsylvania furnaces.

## Reinforcing Bars

Requirements for the bridge over the Connecticut River at Hartford are estimated at 2700 tons. Fresh specifications reveal no important tonnages. Awards during the week were small. Prices, while nominally unchanged, will be afforded a severe test in the prospective lettings of bar contracts for the post office annex and New York Central freight terminal at New York.

## Scrap

Prices reflect firmness. The heavy melting grades, though unchanged at \$5 for No. 1 and \$3.50 to \$4, on barge, are well supported by export demand. Interest from foreign quarters in additional sizable tonnages, chiefly No. 2 steel, has appeared here recently and practically assures a steady flow

of scrap for export for some time. Consumptive demand from domestic users, while lacking pace, is improving. Stove plate, which is being purchased by a broker at \$4.50, on barge, is enjoying an uninterrupted movement to Bayonne, N. J.

## Cincinnati Pig Iron Trade Still Sluggish

CINCINNATI, Feb. 14—Pig iron consumers decline to build any inventories, preferring to cover for specific needs while watching business developments carefully. Bookings the past week were less than 300 tons, all in miscellaneous carload lots. An Indiana melter is inquiring for 200 tons of Northern foundry iron. A slight improvement in the automotive melt is reported, but this has not affected the general level of foundry operations, which continue to be at a low level.

## Steel

A slight improvement in the automotive demand for sheets offset easing of demand from other users the past week, and kept the general level at just above 30 per cent of capacity output. Rolling schedules this week will be abreast of the bookings.

## Scrap

Trading in old materials is retarded by present low prices. Supply sources are "frozen" by unattractive dealers' bids, while mills refuse to take material unless at "bargain" quotations. The Southern Railway is offering its usual list, bids to close this week.

## Fabricated Plate and Steel Castings in 1932

WASHINGTON, Feb. 14—Orders for fabricated steel plate in 1932 totaled 161,810 tons compared with 302,509 tons in 1931, according to reports received by the Bureau of the Census from 48 manufacturers. The 1932 bookings in tons were distributed as follows: Oil storage tanks, 38,976; refinery materials and equipment, 5519; tank cars, 294; gas holders, 7490; blast furnaces, 446; miscellaneous, 109,085. Orders last December were 9519 tons against 7873 in November.

Reports from 130 establishments showed that 1932 orders for com-

mercial steel castings aggregated 155,837 tons, or 8.8 per cent of capacity, against 393,595 tons or 22.5 per cent of capacity in 1931. Production declined to 175,831 tons or 10 per cent of capacity from 437,252 tons or 25 per cent of capacity. Bookings in tons in 1932 were distributed as follows: Railroad specialties, 34,819; miscellaneous, 121,018. Orders last December were 13,022 tons compared with 13,235 tons in November.

## Depreciated Currency Legislation Killed

WASHINGTON, Feb. 14—All chances of obtaining protection against the competition of depreciated currency countries in this session of Congress were killed yesterday when the House of Representatives by a vote of 212 to 174 overrode the Republican proposal to discharge the Ways and Means Committee from further consideration of the Crowther bill to raise duties on imports from countries which have departed from the gold standard.

In the debate preceding the vote Representative Crowther of New York assailed the inconsistency of Democratic leadership in its attitude toward his measure. He said, in part:

"The distinguished leader on the Democratic side, Mr. Rainey, said on the floor of the House on Jan. 9, 1932: 'We do not want this country flooded with the products of cheap labor in other countries.'

"How will your action today square with that statement of his? My Democratic friends seem to have lost interest in American workmen. Any reference to the policy of protection to American industry and labor is studiously avoided in the Democratic platform. A competitive tariff for revenue is your declaration. 'Avaunt protection and quit our sight' is the entrance cue for the 'new deal.'"

Use of welded piping in heating installations is discussed in a 26-page booklet entitled "Piping Tailored to Fit," published by the Air Reduction Sales Co., 60 East Forty-second Street, New York. Illustrations include double-page layouts of domestic piping installations using threaded pipe and fittings and welded pipe and fittings, respectively. Advantages claimed for the welded piping are efficiency, economy and weight saving—the efficiency being due to reduction of friction losses and the economy to the fewer joints, lower insulation costs and other factors. Fabrication of joints and headers on the job, commercial welding fittings, spacing and tacking practices, expansion and contraction and adaptability of oxy-acetylene apparatus are discussed in the booklet.



# Fabricated Structural Steel

## Awards and Inquiries Smallest in Many Weeks

WITH the exception of 1000 tons for grade separation work in Los Angeles and 900 tons for a highway bridge in Oklahoma, fabricated steel lettings were in small lots, totaling only 5900 tons. New projects, at 2500 tons, are also very light and compare with 89,700 tons a week ago. Plate awards account for more than 4700 tons. Awards follow:

### NORTH ATLANTIC STATES

New York, 140 tons, alteration to Dollar Savings Bank, to George A. Just Co.

Rochester, N. Y., 270 tons, State hospital, to F. L. Hughes Co.

Woodbourne, N. Y., 580 tons, prison buildings, to American Bridge Co.

Rome, N. Y., 130 tons, State school, to Ingalls Iron Works Co., previously reported to Pittsburgh Bridge & Iron Works.

State of Pennsylvania, 130 tons, highway bridge, route 439, to American Bridge Co.

Huntingdon, Pa., 500 tons, State industrial school, to Belmont Iron Works.

Philadelphia, 150 tons, building for American Oil Co., to McClintic-Marshall Corp.

Delaware City, Del., 135 tons, Fifth Street bridge for Government, to McClintic-Marshall Corp.

### SOUTH AND SOUTHWEST

Pensacola, Fla., 155 tons, State highway bridge, to Nashville Bridge Co.

Fort Worth, Tex., 240 tons, Belknap Street viaduct, to North Texas Iron & Steel Co.

State of Oklahoma, 900 tons, highway bridge, to J. B. Klein Iron & Foundry Co.

### CENTRAL STATES

Springfield, Ill., 125 tons, building for Mahr Mfg. Co., to Mississippi Valley Structural Co.

Waterloo, Ill., 120 tons, State highway bridge, to McClintic-Marshall Corp.

Chicago, 125 tons, Twelfth Street bridge, to Gage Structural Steel Co.

Texas County, Mo., 125 tons, bridge, to Stupp Brothers Bridge & Iron Co.

### WESTERN STATES

Walsenburg, Colo., 250 tons, bridge, to Midwest Steel & Iron Co.

Castlegate, Utah, 410 tons, highway bridge, to Minneapolis-Moline Power & Implement Co.

San Francisco, 250 tons, Raich apartment building, to Golden Gate Iron Works.

Los Angeles, 1000 tons, bridges for grade separation, to Consolidated Steel Corp.

Barstow, Cal., 400 tons, Mojave River bridge, to Virginia Bridge & Iron Co., Inc., previously reported to McClintic-Marshall Corp.

Sonoma, Cal., 135 tons, theater, to Herrick Iron Works, Oakland, Cal.

### CANAL ZONE

Coco Solo, 100 tons, shop extension, to an unnamed bidder.

## NEW STRUCTURAL STEEL PROJECTS

### NORTH ATLANTIC STATES

New Rochelle, N. Y., 150 tons, St. Joseph's Church and rectory.

### SOUTH AND SOUTHWEST

Fort Worth, Tex., 145 tons, overhead pass for tracks of Texas & Pacific Railroad; bids opened Feb. 13.

Fort Worth, Tex., 600 tons, post office; James I. Barnes, Springfield, Ohio, general contractor.

Charlotte, N. C., 700 tons, bridge over Catawba River between Charlotte and Gastonia, N. C.

### CENTRAL STATES

Leeper, Mo., 500 tons, bridge.

Chicago, Burlington & Quincy, 250 tons, bridge repairs at Ottawa, Ill.

Milwaukee, 154 tons, sheet piling, United States Superintendent of Lighthouses, for North Manitou Shoal Light Station. Proposal 23585; bids close Feb. 27.

Milwaukee, 100 tons, United States Engineer Office, sluice gates for Cedar Dam, at Kimberly, Wis.; bids close Feb. 23 and not March 10 as previously reported.

### WESTERN STATES

San Francisco, 235 tons, telephone building, bids under advisement.

San Diego County, Cal., 492 tons, State bridge; bids to be taken March 1.

## FABRICATED PLATE

### AWARDS

Philadelphia, 1700 tons, tanks for Pennsylvania Sugar Co., to McClintic-Marshall Corp.

Miami, Fla., 275 tons, tank work, to Pittsburgh-Des Moines Steel Co.

Louisville, Ky., 400 tons, two oil barges for Louisville Pipe Line Co., to Jones & Laughlin Steel Corp.

Springfield, Ill., 520 tons, drum gates for river dam, to Mississippi Valley Structural Co.

New Orleans, 210 tons, concrete mixing barge for Sims-Helmer, Inc., to Ingalls Iron Works.

Denver, 200 tons, Hoover Dam cylinder gates, to Westinghouse Electric & Mfg. Co.

Denver, 1300 tons, Hoover Dam tunnel linings, to Goslin-Birmingham Corp.

Vernon, Cal., 100 tons, three tanks, to Western Pipe & Steel Co.

### NEW PROJECTS

Hartland, Wis., W. E. Caldwell Co., Louisville, Ky., low bidder on 60,000-gal. elevated tank on steel tower.

San Diego, Cal., 4500 tons, navy floating dry dock, bids March 8.

Melba, Idaho, 300 tons, irrigation improvements.

Denver, 1000 tons, Moffat tunnel pipe; bids about March 1.

San Francisco, 850 tons, Irvington Tunnel, reported May 12; bids Feb. 24.

## Reinforcing Steel

### Awards 750 Tons—New Projects 3850 Tons

Philadelphia, 200 tons, tanks for Pennsylvania Sugar Co., to Kalman Steel Corp.

Alma, Wis., 350 tons, dam to Paper, Calman-sen & Co., St. Paul.

San Francisco, 200 tons, post office addition, to Pacific Coast Steel Corp.

California and Arizona, 100 tons, highway work for Bureau of Public Works, to various bidders.

### NEW REINFORCING BAR PROJECTS

Hartford, Conn., 2700 tons, bridge over Connecticut River; bids to be taken March 13 by Connecticut State River Bridge Commission, R. A. Johnson, chairman, Hartford.

St. Paul, Minn., 500 tons, post office; previously reported as 150 tons.

Selfridge Field, Mich., tonnage being estimated, gymnasium and theater.

Rantoul, Ill., 125 tons, air corps barracks. Bids closed Feb. 13.

Los Angeles County, Cal., 570 tons, State bridge; bids to be taken March 21.

San Diego County, Cal., 115 tons, State bridge; bids to be taken March 1.

## Pipe Lines

Wilcox Oil & Gas Co., Tulsa, Okla., is considering steel pipe line from point near Oklahoma City, Okla., to oil refinery at Bristow, Okla.

Liquefied Natural Gas Corp., Foshay Tower Building, Minneapolis, has plans for steel pipe

lines for trunk systems and distributing branches for natural gas supply at Tracy, Currie, Westbrook, Storden, Minn., and vicinity. H. H. Henley is company engineer.

Rocky Mountain Gas Co., Denver, an interest of Ohio Gas Co., Findlay, Ohio, has purchased Laramie Gas Co., Laramie, Wyo., and will develop as a subsidiary for natural gas service. Connection will be made with pipe line of Illinois Pipe Line Co., Laramie, another subsidiary of Ohio Oil Co., which will convert a former 8-in. steel pipe oil line from Dutton Creek field, Carbon County, Wyo., to Laramie, about 22 miles, for natural gas transmission, forming main supply for Rocky Mountain company. Entire program, including steel pipe lines for gathering and distributing service, to cost \$600,000.

Ocean Oil Transport & Pipe Line Co., Houston, Tex., contemplates crude oil steel pipe line from Conroe, Tex., oil fields to terminal at Houston, about 40 miles.

## INDUSTRIAL FINANCES

### Interlake Iron Corp.

Interlake Iron Corp. reports for the year ended Dec. 31, 1932, net loss of \$2,169,887, compared with net loss of \$1,357,502 in the preceding year. Net sales for the period totaled \$8,920,836, compared with \$13,399,826 in the previous year. Current assets totaled \$11,470,330 at the close of 1932 and current liabilities were \$1,123,213, compared with \$14,537,045 and \$2,533,764 respectively at the end of 1931.

### Scullin Steel Co.

Scullin Steel Co., St. Louis, reports a net loss for 1932 of \$575,932, including operating loss of \$207,260; expenses of maintaining unoccupied plant, interest and provision for Federal income tax on tax-free bonds. Depreciation was fixed at \$65,510, or 30 per cent of the normal charge. Net loss in 1931 was \$499,289. During 1932 sinking fund requirements were met by the purchase of bonds with a face value of \$105,000 at a discount of \$60,901. Surplus was reduced from \$2,658,580 to \$2,004,449.

### Crucible Steel Co. of America

Crucible Steel Co. of America had a net loss in 1932 of \$3,613,615, not counting \$437,500 paid out in dividends on preferred stock. Total amount deducted from surplus is \$4,344,361. The company reports that its operations in 1932 were 23.42 per cent, compared with 36.85 per cent in 1931 and 65.66 per cent in 1930. The report states that the 1932 business was the worst the company has experienced in its history.

### United Engineering & Foundry Co.

United Engineering & Foundry Co., Pittsburgh, had net loss in 1932, after all charges, including depreciation, of \$340,532 compared with net earnings in the previous year of \$953,708. Last year's loss, prior to inventory adjustment and depreciation, was only \$77,643. In making its financial statement, the United company stated that its estimating department has recently been considerably busier than it was during the greater part of 1932.

# Copper Reflects Improved Tone Both Here and Abroad

**Zinc Price Yields Further to Unfavorable Factors—  
Tin Demand Steady, Though Light; Lead Quiet**

NEW YORK, Feb. 14—The domestic copper market has assumed a stronger tone. Consumer interest is spread over a wider front, and small-lot sales are more frequent. Although the improvement has not yet effected any change in the Connecticut basis for electrolytic, which is held at 5c. for shipment through second quarter, smelters are firming in their attitude and are somewhat reluctant to press sales at the current quotation. Talk of further curtailment in copper production is an added stimulant to the present situation. Concerted action by American producers toward contracting output is not considered likely, but certain units are held to face imperative shutdowns unless copper values improve. Aided by a fairly steady demand, foreign copper values reached higher ground during the week, with sales abroad having been made at 5c. to 5.17c., c.i.f. Of significance to the copper trade was the withdrawal on Feb. 11 of the American Smelting & Refining Co. from Copper Exporters, Inc. Though the company has not yet

stated its new policy covering export business, trade opinion suggests that the concern will seek to market copper independently in foreign quarters.

## Lead

Bookings thus far in February have been in disappointing volume. With few exceptions, buyers are adhering to hand-to-mouth purchases, and interest in March lead is consequently lagging. Prices, though lacking support from consuming quarters, are steady and unchanged at 2.87½c., St. Louis, and 3c., New York.

## Tin

Spot Straits has enjoyed a consistent, though small, demand during the past week. Futures, however, have been neglected. Sustained strength in sterling, which today held steadily at \$3.44, continued to exert a firming influence on prices. On Feb. 9 the spot Straits price at New York climbed to 23.80c., the peak for the recent movement. Values since then

have tended lower, settling today at 23.60c. London prices likewise suffered minor setbacks for the week, with today's postings £149 a ton for spot standard, £149 5s. for future standard, and £154 15s. for spot Straits. The Singapore market today was £152 7s. 6d., compared with £153 10s. a week ago. Shipments from the East up to and including Feb. 11 appeared favorable at 2468 tons. Warehouse stocks in the United Kingdom fell 146 tons last week to 28,647 tons.

## Zinc

Unfavorable statistics, pressure to sell distress lots, and lower ore values combined to depress the price of prime Western zinc down to 2.65c., East St. Louis, or 3.02c., New York, at which level it has remained throughout the week. Although some quiet buying may have been attracted by the lower price, on the surface the market has remained quiet and featureless. Output in January amounted to 19,859 tons against deliveries of only 15,040 tons, resulting in an increase of 4819 tons in surplus stocks.

Benefits of \$1,171,000 were paid to Bethlehem Steel employees through the Bethlehem Steel Corp. relief plan during the past year. The value of this relief plan in assisting cases of financial difficulty during illness is indicated by the fact that 4925 persons came under the disability relief provisions during the year and families of 573 persons received death benefits.

## The Week's Prices. Cents Per Pound for Early Delivery

	Feb. 8	Feb. 9	Feb. 10	Feb. 11	Feb. 14
Electrolytic copper, N. Y.*	4.75	4.75	4.75	4.75	4.75
Lake copper, New York	5.00	5.00	5.00	5.00	5.00
Straits tin, Spot, N. Y.	23.60	23.80	23.75	...	23.60
Zinc, East St. Louis	2.65	2.65	2.65	2.65	2.65
Zinc, New York	3.02	3.02	3.02	3.02	3.02
Lead, St. Louis	2.87½	2.87½	2.87½	2.87½	2.87½
Lead, New York	3.00	3.00	3.00	3.00	3.00

\*Refinery quotations price ¼c. higher delivered in Connecticut.  
Aluminum, 98 to 99 per cent pure, 22.90c. a lb., delivered.  
Nickel, electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered.  
Antimony, 5.75c. a lb., New York.  
Brass ingots, 85-5-5-5, 5.25c. a lb., New York and Philadelphia.

### From New York Warehouse

Delivered Prices, Base per Lb.	
Tin, Straits pig	25.50 to 26.50c.
Tin, bar	27.50c. to 29.50c.
Copper, Lake	7.50c. to 8.50c.
Copper, electrolytic	7.25c. to 8.25c.
Copper, casting	7.00c. to 8.00c.
*Copper sheets, hot-rolled	13.62½c.
*High brass sheets	11.00c.
*Seamless brass tubes	13.25c.
*Seamless copper tubes	12.37½c.
*Brass rods	8.50c.
Zinc, slabs	4.37½c. to 4.87½c.
Zinc sheets (No. 9), casks	9.25c. to 9.50c.
Lead, American pig	3.75c. to 4.25c.
Lead, bar	5.25c. to 6.25c.
Lead, sheets	6.75c.
Antimony, Asiatic	8.00c. to 9.00c.
Alum., virgin, 99 per cent plus	23.30c.
Alum. No. 1 for remelt-ing, 98 to 99 per cent	16.00c.
Solder, ½ and ⅓	15.50c. to 16.50c.
Babbitt metal, commercial grade	21.00c. to 32.00c.

\*These prices are also for delivery from Chicago and Cleveland warehouses.

### From Cleveland Warehouse

Delivered Prices per Lb.	
Tin, Straits pig	27.50c.
Tin, bar	29.50c.
Copper, Lake	6.125c.

Copper, electrolytic	6.125c.
Copper, casting	5.875c.
Zinc, slab	4.25c. to 4.50c.
Lead, American pig	3.75c. to 4.00c.
Lead, bar	7.25c.
Antimony, Asiatic	8.50c.
Babbitt metal, medium grade	16.50c.
Babbitt metal, high grade	31.25c.
Solder, ½ and ⅓	17.00c.

### Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	3.75c.	4.25c.
Copper, hvy. and wire	3.50c.	4.25c.
Copper, light and bottoms	2.625c.	3.50c.
Brass, heavy	1.625c.	2.25c.
Brass, light	1.25c.	1.75c.
Hvy. machine composition	2.50c.	3.00c.
No. 1 yel. brass turnings	2.125c.	2.50c.
No. 1 red brass or compos. turnings	2.375c.	3.00c.
Lead, heavy	2.125c.	2.50c.
Zinc	1.25c.	1.625c.
Cast aluminum	3.75c.	5.00c.
Sheet aluminum	8.00c.	9.75c.

## Railroad Equipment

Chicago Tank Car Co. has acquired rolling stock of Railway Car & Equipment Corp., consisting of 550 cars.

Santa Cruz, Cal., 129 tons, to Utilities Supply Co.

Oakland, Cal., 250 tons, to United States Pipe & Foundry Co.

Vernal City, Utah, 361 tons; bids soon.

Los Angeles, 3323 tons of 8-in.; bids Feb. 21.

## Cast Iron Pipe

Asphalt-impregnated concrete liners are suggested for pickling vats by Hamilton M. Wright, 3903 Chrysler Building, New York, who has studied experiments conducted over a number of years by Los Angeles harbor authorities to insulate concrete piers against the destructive effects of sulphates in sea water. Asphalt impregnation has now been applied to tiles for lining sewers and sewage disposal tanks, and for drainage pipes and irrigation ditches as well as pickling tanks. The usual method of impregnation is to place the formed material (or, if tile, the baked material), in a retort from which the air is exhausted and the temperature then slowly raised to 250 deg. F. Hot asphalt is then forced in and the retort allowed gradually to cool.



\* In quantities of 10,000 to 19,999 lb.

		Base new Lb.
Smooth annealed wire	.....	\$2.25
Smooth galvanized wire	.....	2.60
Polished staples	2.50 to	2.55
Galvanized staples	2.75 to	2.80
Barbed wire, galvanized	2.30 to	2.35

**Seamless Mechanical Tubing**

	<i>Per Cent Off List</i>
Carbon, 0.10% to 0.30% base (carload) 55	
Carbon, 0.30% to 40% base.....	50

Plus differential for lengths over 18 ft.  
and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

Pittsburgh .....	\$26.00
Youngstown .....	26.00
Cleveland .....	26.00

(Turn to next page)

Sheep	
(F.o.b. Pittsburgh or Youngstown)	
Grooved	Per Lb. 1.60c.
Universal	1.60c.
Sheared	1.60c.

Wire Rods	
(Common soft, base)	
Pittsburgh	Per Gross Ton \$35.00
Cleveland	35.00
Chicago	36.00

## COKE, COAL AND FUEL OIL

Coke	
Per Net Ton	
Furnace, f.o.b. Connellsville	\$1.75 to \$2.00
Prompt	
Foundry, f.o.b. Connellsville	2.50 to 4.25
Foundry, by-product, Chicago	
ovens, for delivery outside switching districts	7.00
Foundry, by-product, delivered in Chicago switching district	7.75
Foundry, by-product, New England, delivered	10.00
Foundry, by-product, Newark or Jersey City, del'd	8.20 to 8.81
Foundry, by-product, Phila., land, delivered	8.50
Foundry, Birmingham	5.00
Foundry, by-products, St. Louis, f.o.b. ovens, del'd	8.00
Foundry, by-products, del'd St. Louis	9.00

Coal	
Per Net Ton	
Mine run steam coal, f.o.b. W. Pa. mines	\$1.00 to \$1.15
Mine run coking coal, f.o.b. W. Pa. mines	1.10 to 1.25
Gas coal, 4-in., f.o.b. Pa. mines	1.25 to 1.40
Mine run gas coal, f.o.b. Pa. mines	1.20 to 1.30
Steam slack, f.o.b. W. Pa. mines	0.25 to 0.35
Gas slack, f.o.b. W. Pa. mines	0.35 to 0.45

Fuel Oil	
Per Gal. f.o.b. Bayonne, N. J.	
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.

Per Gal. f.o.b. Baltimore	
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.

Per Gal. del'd Chicago	
No. 2 industrial fuel oil	2.80c. to 2.90c.
No. 5 industrial fuel oil	2.45c. to 2.50c.

Per Gal. f.o.b. Cleveland	
No. 3 distillate	5.25c.
No. 4 industrial	4.75c.

## REFRACTORIES

Fire Clay Brick	
Per 1000 f.o.b. Works	
High-heat Intermediate Duty Brick	\$35.00 to \$30.00
Penn.	35.00
Maryland	35.00
New Jer.	34.00 to 37.00
Ohio	35.00
Kentucky	35.00
Missouri	35.00
Illinois	35.00
Ground fire clay, per ton	6.50

Chrome Brick	
Per Net Ton	
Standard size	\$42.50

Silica Brick	
Per 1000 f.o.b. Works	
Pennsylvania	\$38.00
Chicago	37.00
Birmingham	50.00
Silica clay, per ton	8.00

Magnesite Brick	
Per Net Ton	
Standard sizes, burned, f.o.b. Baltimore and Chester, Pa.	\$61.50
Unburned, f.o.b. Baltimore	52.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	38.50
Domestic, f.o.b. Chewelah, Wash.	20.90

## CAST IRON PIPE

Per Net Ton	
6-in. and larger, del'd Chicago	\$40.40 to \$41.40
4-in., del'd Chicago	43.40 to 44.40
6-in. and larger, del'd New York	35.30
4-in., del'd New York	38.30
6-in. and larger, Birmingham	32.00
4-in., Birmingham	36.00

Class "A" and gas pipe, \$3 extra.

## VALLEY

Per Gross ton, f.o.b. Valley furnace:	
Basic	\$13.50
Bessemer	15.00
Gray Forge	14.50
No. 2 foundry	14.50
No. 3 foundry	14.50
Malleable	\$14.50 to 15.00
Low phos., copper free	23.00 to 25.00

Freight rate to Pittsburgh or Cleveland district, \$1.89.

## PITTSBURGH

Per Gross ton, f.o.b. Pittsburgh district furnace:	
Basic	\$14.00
No. 2 foundry	15.00
No. 3 foundry	14.50
Malleable	15.00
Bessemer	15.00

Freight rates to points in Pittsburgh district range from 60c. to \$1.26.

## CHICAGO

Per gross ton at Chicago furnace:	
N't'n No. 2 fdy.	\$15.50
N't'n No. 1 fdy.	16.00
Malleable, not over 2.25 sil.	15.50
High phosphorus	15.50
Lake Super. charcoal, sil. 1.50, by rail	23.17
Southern No. 2 fdy.	16.14
Low phos., sil. 1 to 2. Copper free.	25.00
Silvery, sil. 3 per cent.	23.07
Beas. ferroil'n, 15 per cent.	28.92

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnaces, not including a switching charge.

## ST. LOUIS

Per gross ton at St. Louis:	
No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	\$17.50
Malleable, f.o.b. Granite City	17.50
Northern No. 2 fdy., del'd St. Louis	\$17.80 to 18.30
Southern No. 2 fdy., del'd St. Louis	14.56
Northern malleable, del'd St. Louis	17.80 to 18.30
Northern basic, del'd St. Louis	17.80 to 18.30

Freight rates 83c. (average) Granite City to St. Louis; \$2.30 from Chicago; \$4.58 from Birmingham.

## NEW YORK

Per gross ton, delivered New York district:	
* Buffalo, No. 2, del'd east	\$17.41 to \$17.64
East Pa. No. 2 fdy.	14.02
East Pa. No. 2X fdy.	14.52

Freight rates: \$1.52 to \$2.63 from eastern Pennsylvania.  
\* Prices delivered to New Jersey cities having rate of \$3.41 a ton from Buffalo.

## BUFFALO

Per gross ton, f.o.b. furnace:	
No. 2 fdy.	\$18.00
No. 3 fdy.	17.50
No. 1 fdy.	17.50
Malleable, sil. up to 2.25	16.50
Basic	15.50
Lake Superior charcoal, del'd	23.41

Per gross ton, delivered Cincinnati:	
Ala. fdy., sil. 1.75 to 2.25	\$13.82
Ala. fdy., sil. 2.25 to 2.75	14.32
Tenn. fdy., sil. 1.75 to 2.25	13.82
N't'n No. 2 foundry	\$17.01 to 17.59
S't'n Ohio silvery, 8%	21.02

Freight rates, \$2.02 from Ironton and Jackson, Ohio; \$3.82 from Birmingham.

## CLEVELAND

Per gross ton at Cleveland furnace:	
N't'n No. 2 fdy. (local delivery)	\$15.00
S't'n fdy., sil. 1.75 to 2.25	16.14
Malleable (local delivery)	18.00
Ohio silvery, 8 per cent.	21.87
Stand. low phos., Valley	23.00

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates: 65c. average local switching charge; \$3.12 from Jackson, Ohio; \$6.14 from Birmingham.

## PHILADELPHIA

Per gross ton at Philadelphia:	
East. Pa. No. 2	\$13.34 to \$13.84
East. Pa. No. 2X	13.84 to 14.34
East. Pa. No. 1X	14.34 to 14.84
Basic (del'd east, Pa.)	13.80 to 14.06
Malleable	14.74 to 18.01
Stand. low phos. (f.o.b. east. Pa. furnace)	20.00 to 21.00
Cop. b'rg low phos.	20.00 to 21.00
Va. No. 2	21.79
Va. No. 2X	22.20

Prices, except as specified otherwise, are del'd Philadelphia. Freight rates: \$1c. to \$1.79 from eastern Pennsylvania furnaces; \$4.67 from Virginia furnaces.

## BIRMINGHAM

Per gross ton, f.o.b. Birmingham dist. furnace:	
No. 2 fdy., 1.75 to 2.25 sil.	\$11.00
No. 2 soft, 2.25 to 2.75 sil.	11.50
Basic	11.00

## NEW ENGLAND

Per gross ton delivered to most New England points:	
* Buffalo, sil. 1.75 to 2.25	\$19.05
* Buffalo, sil. 2.25 to 2.75	19.05
* Buffalo, sil. 1.75 to 2.25	17.41
* Buffalo, sil. 2.25 to 2.75	17.41
* Ala., sil. 1.75 to 2.25	15.64
* Ala., sil. 2.25 to 2.75	16.14

Freight rates: \$5.05 all rail from Buffalo, and \$3.41 to \$3.91 rail and water from Buffalo when \$1 barge and \$2 to \$2.50 New England freight rate are obtainable; \$5.64 rail and water from Alabama to New England seaboard.  
\* All-rail rate.

† Rail-and-water rate.

## CANADA

Per gross ton:	
Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	\$22.60
No. 2 fdy., sil. 1.75 to 2.75	22.10
Malleable	22.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	\$24.00
No. 2 fdy., sil. 1.75 to 2.25	23.50
Malleable	24.00
Basic	\$23.00 to 23.50

## Ferromanganese

Per Gross Ton	
Domestic, 80%, seaboard	\$68.00
Foreign, 80%, Atlantic or Gulf port, duty paid	68.00

Prices for lots of one carload or more; extras applied on less than carload lots.

## Spiegelisen

Per Gross Ton Furnace	
Domestic, 19 to 21%	\$24.00

## Electric Ferrosilicon

Per Gross Ton Delivered	
50% (carloads)	\$74.50
50% (less carloads)	82.00
75% (carloads)	120.00
75% (less carloads)	130.00
14% to 16% (f.o.b.) Welland, Ont. (in carloads)	31.00
14% to 16% (less carloads)	36.00

## Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace	
Per Gross Ton	Per Gross Ton
10% \$20.50	14% \$23.50
11% 21.00	15% 24.00
12% 21.50	16% 25.00
13% 22.50	17% 26.50

## Silvery Iron

F.o.b. Jackson County, Ohio, Furnace	
Per Gross Ton	Per Gross Ton
6% \$18.00	13% \$20.50
7% 18.50	13% 21.00
8% 18.75	14% 22.50
9% 19.00	15% 23.00
10% 19.50	16% 24.00
11% 20.00	17% 25.50

## Other Ferroalloys

Ferrotungsten, per lb. wo. del., carloads	\$14c.
Ferrotungsten, less carloads	\$1.00

## PITTSBURGH

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$8.00 to \$9.00
No. 2 heavy melting steel	7.25 to 7.75
Scrap rails	8.50 to 9.00
Rails 3 ft. and under	10.00 to 10.50
Sheet bar crops, ordinary	9.00 to 9.50
Compressed sheet steel	8.00 to 8.50
Hand bundled sheet steel	7.00 to 7.50
Hvy. steel axle turnings	7.00 to 7.50
Machine shop turnings	6.25 to 6.75
Short shov. steel turnings	6.25 to 6.75
Short mixed borings and turnings	5.50 to 6.00
Cast iron borings	5.50 to 6.00
Cast iron carwheels	8.00 to 8.50
Heavy breakable cast.	8.00 to 8.50
No. 1 cast	8.50 to 9.50
Railr. knuckles and couplers	9.00 to 10.00
Rail. coil and leaf springs	9.00 to 10.00
Roller steel wheels	9.00 to 10.00
Low phos. billet crops	10.50 to 11.00
Low phos. sheet bar crops	10.50 to 11.00
Low phos. plate scrap	9.50 to 10.00
Low phos. punchings	10.00 to 10.50
Steel car axles	11.00 to 11.50

## CHICAGO

Delivered Chicago district consumers:	
Per Gross Ton	Per Gross Ton
Heavy melting steel	\$5.00 to \$5.50
Shoveling steel	5.00 to 5.50

Ferrocromium, 4 to 8% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	16.50c. to 17.00c.
Ferrocromium, 2% carbon	16.50c. to 17.00c.
Ferrocromium, 1% carbon	17.50c. to 18.00c.
Ferrocromium, 0.10% carbon	18.00c. to 18.50c.
Ferrocromium, 0.06% carbon	20.00c. to 20.50c.
Ferrovandium, del., per lb. contained Va.	\$3.00 to \$3.50
Ferrocobaltum, 15 to 18%, per net ton, f.o.b. furnace in carloads	25.00c. to 25.50c.
Ferrophosphorus, electric, or blast furnace material, in carloads, 18%, Rockdale, Tenn., base per gross ton with 13 units	50.00
Ferrophosphorus, electric, 24% f.a.b. Anniston, Ala., per gross ton with 27.5 units	65.00
Ferromolybdenum, per lb. Mo., del.	80c.
Calcium molybdate, per lb. Mo., del.	80c.
Silico spiegel, per ton, f.o.b. furnace, car lots	\$34.00
Ton lots or less, per ton	41.00
Silico-manganese, gross ton, delivered:	
2.50% carbon grade	35.00
2% carbon grade	34.00
1% carbon grade	33.00
Spot prices	\$5 a ton higher

## Ores

Lake Superior Ores, Delivered Lower Lake Ports	
Per Gross Ton	

Old range Bessemer, 51.50% iron	\$4.00
Old range, non-Bessemer, 51.50% iron	4.00
Mesaqui Bessemer, 51.50% iron	4.00
Mesaqui non-Bessemer, 51.50% iron	4.00
High phosphorus, 51.50% iron	4.00
Foreign Ore, c.i.f. Philadelphia or Baltimore	

Per Gross Ton	
Iron, low phos., copper free, 55 to 58% iron, dry Spanish or Algerian	8c. to 8.50c.
Iron, low phos., Swedish, average 63% iron	8c.
Iron, basic or foundry, Swedish, average 65% iron	8c.
Iron, basic or foundry, Russian, aver. 63% iron (nom.)	8c.
Manganese, Caucasian, washed 52%	21c. to 22c.
Manganese, African, Indian, 50-52%	21c. to 22c.
Manganese, Brazilian, 48 to 49%	21c. to 22c.

Per Net Ton Del.	
Tungsten, Chinese wolframite, duty paid	\$10.00
Tungsten, domestic scheelite	\$8.00 to \$10.00
Chromite, 45%, Cr2O3, crude, c.i.f. Atlantic seaboard	10.00
Chromite, 48%, Cr2O3, c.i.f. Atlantic seaboard	10.00

Per Gross Ton	
Chromite, 45%, Cr2O3, crude, c.i.f. Atlantic seaboard	10.00
Chromite, 48%, Cr2O3, c.i.f. Atlantic seaboard	10.00

\* Quotations nominal in absence of sales.

## Fluorspar

Per Net Ton	
Domestic, washed gravel 85-5, f.o.b. Kentucky and Illinois mines	\$9.00 to \$10.00
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	12.00
Foreign, 85% calcium fluoride, net over 5% silicon, c.i.f. Atlantic port, duty paid	\$10.00 to 10.75
Domestic, No. 1 ground bulk, 85 to 98% calcium fluoride, net over 2 1/2% silicon, f.o.b. Illinois and Kentucky mines	90.00

# Iron and Steel Scrap

PITTSBURGH		
Per gross ton delivered consumers' yards:		
No. 1 heavy melting steel	\$8.00 to	\$9.00.
No. 2 heavy melting steel	7.25 to	7.75
No. 2 railroad wrought...	8.50 to	9.00
Sheet piling	9.50 to	10.00
Rails 3 ft. and under	10.00 to	10.50
Sheet bar crops, ordinary	9.00 to	9.50
Compressed steel steel...	8.00 to	8.50
Standard steel	7.00 to	7.50
Hvy. steel axle turnings	7.00 to	7.50
Machine shop turnings...	6.25 to	6.75
Short shop, steel turnings...	6.25 to	6.75
Short mixed borings and turnings	5.50 to	6.00
Cast iron borings	5.50 to	6.00
Cast iron carwheels...	8.00 to	8.50
Heavy breakable cast...	8.00 to	8.50
Roller carwheels	8.50 to	9.50
Rail knuckles and rollers	9.00 to	10.00
Rail, coil and leaf springs	9.00 to	10.00
Roller steel wheels	10.00 to	10.00
Low phos. billet bar crops	10.50 to	11.00
Low phos. steel bar crops	10.50 to	11.00
Frogs, switches and guards	\$5.00 to	\$5.50
Hydraulic comp. sheets	4.00 to	4.50
Drop forge flashings	4.00 to	4.50
No. 1 bushing	3.50 to	4.00
Roller carwheels	7.00 to	8.00
Railroad leaf springs	7.75 to	8.25
Axle turnings	4.50 to	5.00
Steel couplers and knuckles	7.00 to	7.50
Coil springs	8.25 to	8.50
Axle turnings (cur.)	5.00 to	5.50
Low phos. punchings	8.50 to	9.00
Low phos. plates, 12 in. and under	8.00 to	8.50
Cast iron linkages	3.25 to	3.75
Short shoveling turnings	3.25 to	3.75
Machine shop turnings...	3.00 to	3.50
Rolling rails	7.50 to	8.00
Steel rails, less than 3 ft.	7.50 to	8.00
Steel rails, less than 3 ft.	7.50 to	8.00
Anchor bars	7.00 to	7.50
Cast iron carwheels	8.00 to	8.50
Railroad malleable	5.50 to	6.00
Agricultural malleable	5.00 to	5.50
*Relaying rails, 50 to 40 lb.	18.00 to	17.00
*Relaying rails, 65 lb. and over	19.00 to	18.00



No. 2 busheling	\$2.00 to \$2.50
Locomotive tires, smooth	7.50 to 8.50
Pipe and flues	1.25 to 1.75
No. 1 machinery cast	6.25 to 6.75
Clean automobile cast	7.25 to 7.75
No. 1 railroad cast	5.75 to 6.25
No. 1 agricultural cast	5.75 to 6.25
Stove plate	5.50 to 6.00
Grate bars	6.25 to 6.75
Brake shoes	6.00 to 6.50

\*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

#### PHILADELPHIA

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$6.50 to \$7.00
No. 2 heavy melting steel	5.00 to 5.50
No. 1 railroad wrought	7.50 to 8.00
Bundled sheets	4.00 to 4.50
Hydraulic compressed, new	4.50 to 6.00
Hydraulic compressed, old	4.00 to 4.50
Machinery shop turnings	4.50 to 5.00
Heavy axle turnings	3.50 to 4.00
Cast borings	3.50 to 3.75
Heavy breakable cast	5.50 to 6.00
Stove plate (steel works)	10.00 to 10.50
No. 1 low phos. heavy	8.50 to 9.00
Couplers and knuckles	8.50 to 9.00
Roller steel wheels	3.50 to 3.75
No. 1 blast furnace	6.50 to 7.00
Spec. iron and steel pipe	12.00 to 13.00
Shafting	12.00 to 13.00
Steel axles	12.00 to 13.00
No. 1 forge fire	5.50 to 6.00
Cast iron car wheels	8.00 to 8.50
No. 1 cast	8.00 to 8.50
Cast borings (chem.)	8.00 to 10.00
Steel rails for rolling	9.00 to 9.50

#### CLEVELAND

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$7.00 to \$7.25
No. 2 heavy melting steel	6.25 to 6.50
Compressed sheet steel	6.00 to 6.50
Light bundled sheet stamp	4.00 to 4.50
Drop forge flashings	5.25 to 5.75
Machine shop turnings	4.00 to 4.25
Short shoveling turnings	4.00 to 4.50
No. 1 busheling	5.00 to 5.50
Steel axle turnings	4.00 to 4.50
Low phos. billet crops	10.00 to 11.00
Cast iron borings	4.50 to 5.00
Mixed borings and short turnings	4.50 to 5.00
No. 2 busheling	4.25 to 4.50
No. 1 cast	7.00 to 7.50
Railroad grate bars	5.00 to 5.50
Stove plate	5.00 to 5.50
Under 3 ft.	8.50 to 9.00
Rails for rolling	8.50 to 9.00
Railroad malleable	6.75 to 7.00
Cast iron car wheels	8.00

#### BUFFALO

Per gross ton, f.o.b. Buffalo consumers' yards:	
No. 1 heavy melting steel	\$7.00 to \$7.25
No. 2 heavy melting steel	6.50 to 7.00
Scrap rails	6.00 to 6.50
New hydraulic comp. sheets	6.00 to 6.50
Old hydraulic comp. sheets	5.00 to 5.50
Drop forge flashings	5.50 to 6.00
No. 1 busheling	5.50 to 6.00
Hyv. steel axle turnings	4.00 to 4.50
Machine shop turnings	4.00 to 4.50
Knuckles and couplers	9.00 to 9.50
Coil and leaf springs	9.00 to 9.50
Roller steel wheels	9.00 to 9.50
Low phos. billet crops	9.00 to 9.50
Short short steel turnings	5.50 to 6.00
Short mixed borings and turnings	3.75 to 4.25
Cast iron borings	3.75 to 4.25
No. 3 busheling	3.50 to 4.00
Steel axle turnings	10.00 to 11.00
No. 1 machinery cast	8.50 to 9.00
No. 1 cupola cast	8.50 to 9.00
Stove plate	7.00 to 7.50
Steel rails, 8 ft. and under	9.25 to 9.75
Cast iron car wheels	3.00 to 3.50
Industrial malleable	7.50 to 8.00
Railroad malleable	7.00 to 7.50
Chemical borings	7.50 to 8.00

#### BIRMINGHAM

Per gross ton delivered consumers' yards:	
Heavy melting steel	\$7.50 to \$8.00
Scrap steel rails	8.00 to 8.50
Short shoveling turnings	4.00 to 4.50
Stove plate	6.00 to 6.50
Iron axles	9.00 to 9.50
No. 1 railroad wrought	4.50 to 5.00
Rails for rolling	8.00 to 8.50
No. 1 cast	8.50 to 9.00
Tramcar wheels	8.50 to 9.00
Cast iron borings, chem.	8.50 to 9.00

#### ST. LOUIS

Per gross ton delivered consumers' yards:	
Selected heavy steel	\$5.50 to \$6.00
No. 1 heavy melting	4.50 to 5.00
No. 2 heavy melting	4.75 to 5.25
No. 1 locomotive tires	5.00 to 5.50
Misc. stand-sec. rails	5.50 to 6.00
Railroad springs	6.00 to 6.50
Bundled sheets	2.00 to 2.50
No. 1 railroad wrought	5.00 to 5.50
No. 1 busheling	3.50 to 4.00
Cast iron borings and shoveling turnings	2.75 to 3.25
Rails for rolling	6.75 to 7.25
Machine shop turnings	2.00 to 2.50
Heavy turnings	3.00 to 3.50
Steel car axles	11.00 to 11.50
Iron car axles	4.00 to 4.50
Wrot. iron bars and trans.	3.50 to 4.00
No. 1 railroad wrought	7.00 to 7.50
Steel rails less than 3 ft.	6.00 to 6.50
Cast iron car wheels	5.00 to 5.50
No. 1 machinery cast	6.50 to 7.00
Railroad malleable	6.00 to 6.50
No. 1 railroad cast	6.25 to 6.75
Stove plate	6.00 to 6.50
Relay, rails, 60 lb. and under	16.00 to 16.50

Relay, rails, 60 lb. and over	\$20.00 to \$21.00
Agricult. malleable	4.00 to 4.50

#### BOSTON

Dealer's buying prices per gross ton:	
No. 1 heavy melting steel	\$3.00 to \$3.25
Scrap T rails	2.50 to 2.75
Machine shop turnings	0.80 to 1.00
Cast iron borings	1.05 to 1.20
Bundled skeleton, long	2.00 to 2.10
Forge flashings	3.00 to 3.50
Flat furnace scrap	0.90 to 1.00
Forge scrap	3.00 to 3.25
Shafting	9.50 to 10.00
Steel car axles	9.00 to 9.50
Wrought pipe	4.00 to 4.25
Rails for rolling	4.50 to 5.00
Cast iron borings, chemical	7.00 to 7.25

Per gross ton delivered consumers' yards:	
Textile cast	\$7.00 to \$7.50
No. 1 machinery cast	7.50 to 8.00
Stove plate	5.00 to 5.25
Railroad malleable	0.90 to 0.95

#### NEW YORK

Dealer's buying prices per gross ton:	
No. 1 heavy melting steel	\$3.50 to \$5.00
No. 2 heavy melting steel	3.50 to 4.00
Heavy melting steel (yard)	1.50 to 1.75
No. 1 heavy breakable cast	5.00 to 5.25
Stove plate (steel works)	2.50 to 2.80
Machine shop turnings	0.75 to 1.25
Short shoveling turnings	0.75 to 1.25
Cast borings	0.50 to 1.00
No. 1 blast furnace	0.50 to 1.00
Steel car axles	8.00 to 8.50

#### PITTSBURGH

Base per Lb.	
Plates	2.85c
Structural shapes	2.85c
Soft steel bars and small shapes	2.85c
Reinforcing steel bars	2.85c
Cold-finished and screw stock	2.85c
Rounds and hexagons	2.95c
Squares and flats	3.45c
Hoops and bands, under 1/4 in.	2.95c
Hot-rolled annealed sheets (No. 24)	3.10c
25 or more bundles	3.35c
Hot-rolled sheets (No. 10)	2.65c
Galv. corrug. sheets (No. 28), per square (less than 3750 lb.)	\$3.61
Spikes, large	2.40c
Spikes, small	2.65c
Boat	2.90c
Track bolts, all sizes, per 100 count, 70 per cent off list	
Machine bolts, 100 count, 70 per cent off list	
Carriage bolts, 100 count, 70 per cent off list	
Nuts, all styles, 100 count, 70 per cent off list	
Large rivets, base per 100 lb.	\$3.00
Wire, black, soft ann'd'd base per 100 lb.	2.65
Wire, galv. soft, base per 100 lb.	3.10
Common wire nails, per keg	3.20
Cement coated nails, per keg	2.20

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applied to orders of 400 to 999 lb.

#### CHICAGO

Base per Lb.	
Plates and structural shapes	3.00c
Reinforcing bars	2.75c
Hot-rolled sheets (No. 24)	3.45c
Hot-rolled sheets (No. 10)	2.75c
Galv. sheets (No. 24)	3.75c
Galv. sheets (No. 10)	2.75c
Track bolts	4.30c
Rivets, structural	3.75c
Rivets, boiler	3.75c
Machine bolts	65
Carriage bolts	65
Cone and lag screws	65
Hot-pressed nuts, sq. tap. or blank	65
Hot-pressed nuts, hex. tap. or blank	65
Hex. head cap screws	80 and 10
Cup point set screws	75 and 10
Flat head bright wood screws	52 1/2 and 60
Springs	80
Stove bolts	80
Rd. hd. tank rivets, 7/16 in. and smaller	65
Wrought washers	34.50 off list
No. 8 black ann'd'd wire, per 100 lb.	\$3.45
Com. wire nails, base per keg	\$3.40
Cement c't'd nails, base per keg	2.20

#### NEW YORK

Base per Lb.	
Plates and struc. shapes	3.10c
Soft steel bars, small shapes	3.10c
Iron bars, swed. charcoal	6.00c to 6.50c
Cold-fin. shafting and screw stock	3.54c
Rounds and hexagons	3.54c
Flats and squares	4.04c
Cold-roll. strip, soft and quarter hard	4.95c
Boards	3.30c
Hoops	3.30c
Hot-rolled sheets (No. 10)	3.00c
Hot-rolled ann'd'd sheets (No. 24)	3.25c
Galvanized sheets (No. 24)	3.75c
Long term sheets (No. 24)	4.50c
Standard tool steel	12.00c
Wire, black annealed (No. 10)	3.60c
Wire, galv. annealed (No. 10)	4.05c
Tire steel 1/4 x 1/4 in. and larger	3.40c
Smooth finish, 1 to 2 1/4 x 1/4 in. and larger	3.75c

Spec. iron and steel pipe	\$2.50 to \$2.75
Forge fire	2.75 to 3.00
No. 1 railroad wrought	4.00 to 4.50
No. 1 yard wrought long	3.25 to 3.50
Rails for rolling	5.00 to 5.50
No. 1 cast	4.50 to 4.75
No. 2 cast	4.50 to 4.75
Stove plate (foundry)	4.50 to 4.75
Malleable cast (railroad)	4.00 to 4.50
Cast borings (chemical)	6.00 to 6.50
Per gross ton, delivered local foundries:	
No. 1 machinery cast	\$9.00
No. 1 hvy. cast (cupola size)	7.50 to 8.00
No. 2 cast	4.00 to 4.50

#### CINCINNATI

Dealer's buying prices per gross ton:	
Heavy melting steel	\$5.00 to \$5.50
Scrap rails for melting	6.00 to 6.50
Loose sheet clippings	1.00 to 1.50
Bundled sheets	3.75 to 4.25
Cast iron borings	3.00 to 3.50
Machine shop turnings	3.00 to 3.50
No. 1 busheling	4.50 to 5.00
No. 2 busheling	2.75 to 3.25
Rails for rolling	6.50 to 7.00
No. 1 locomotive tires	7.00 to 7.50
Short rails 1/2 in. and smaller	9.00 to 9.50
Cast iron car wheels	9.50 to 10.00
No. 1 machinery cast	6.50 to 7.00
No. 1 railroad cast	6.00 to 6.50
Burnt cast	4.25 to 4.75
Stove plate	4.25 to 4.75
Agricultural malleable	6.75 to 7.25
Railroad malleable	7.00 to 7.50

Open-hearth spring steel, bases	
Common wire nails, base, per keg	\$2.60
Machine bolt, nut thread:	Off List
1/4 x 6 in. and smaller	65 to 65 and 10
1 x 30 in. and smaller	65 to 65 and 10
Carriage bolts, nut thread:	Off List
1/4 x 6 in. and smaller	65 to 65 and 10
1 x 30 in. and smaller	65 to 65 and 10
Boiler tubes:	Per 100 Ft.
Lap welded, 2-in.	\$18.05
Seamless welded, 2-in.	19.24
Charcoal iron, 2-in.	24.94
Charcoal iron, 4-in.	63.65

\*No. 28 and lighter, 30 in. wide, 20c higher per 100 lb.

#### ST. LOUIS

Base per Lb.	
Plates and struc. shapes	3.25c
Bars, soft steel or iron	3.00c
Cold-fin. rounds, shafting, screw stock	3.30c
Hot-rolled annealed sheets (No. 24)	3.70c
Galv. sheets (No. 24)	4.00c
Hot-rolled sheets (No. 10 up to and inc. 48 in. wide)	3.00c
Hot-rolled sheets (No. 24) over 48 in. wide	3.15c
Black corrug. sheets (No. 24)	3.75c
Gal. corrug. sheets	4.05c
Structural rivets	4.00c
Boiler rivets	4.00c

Per Cent Off List	
Tank rivets, 7/16 in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	65
Carriage bolts	65
Lag screws	65
Hot-pressed nuts, sq. blank or tapped, 200 lb. or more	65
Less than 200 lb.	55
Hot-pressed nuts, hex. blank or tapped, 200 lb. or more	65
Less than 200 lb.	55

#### PHILADELPHIA

Base per Lb.	
*Plates, 1/4-in. and heavier	2.45c
*Structural shapes	2.45c
*Soft steel bars, small shapes, iron bars (except bands)	2.45c
Reinforc. steel bars, sq., twisted and deformed	2.30c
Cold-finished steel bars	3.35c
*Steel hoops	3.00c
*Cold bands, No. 12 to 3/16 in. incl.	2.75c
Spring steel	5.00c
Hot-rolled annealed sheets (No. 24)	3.55c
Galvanized sheet (No. 24)	3.75c
*Hot-rolled annealed sheets (No. 10)	2.90c
Diam. pat. floor plates, 1/4 in. and larger	5.00c
Swedish iron bars	5.60c

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

\*Base prices subject to deductions on orders aggregating 4000 lb. or over.

#### CLEVELAND

Base per Lb.	
Plates and struc. shapes	2.95c
Soft steel bars	2.75c
Reinforc. steel bars	1.75c to 1.95c
Cold-fin. rounds and hex.	2.95c
Cold-fin. flats and sq.	3.45c
Flat rolled steel under 1/4 in.	3.00c
Cold-finished strip	5.55c
Hot-rolled annealed sheets (No. 24)	2.25c
Galvanized sheets (No. 24)	3.75c
Hot-rolled sheets (No. 10)	3.00c
Black ann'd'd wire, per 100 lb.	\$2.55
No. 9 galv. wire, per 100 lb.	2.90
Com. wire nails, base per keg	2.10

\*Not base, including boxing and cutting to length.

#### CINCINNATI

Base per Lb.	
Plates and struc. shapes	3.25c
Bars, soft steel or iron	3.00c
New billet reinf. bars	3.00c
Rails steel reinf. bars	3.00c

#### DETROIT

Dealer's buying prices per gross ton:	
Hvy. melting steel	\$4.50 to \$5.00
Borings and short turnings	2.25 to 2.75
Long turnings	2.00 to 2.50
No. 1 machinery cast	7.75 to 8.25
Automotive cast	8.00 to 8.50
Hydraulic comp. sheets	4.00 to 4.50
Stove plate	3.00 to 3.50
New No. 1 busheling	3.75 to 4.25
Old No. 2 busheling	1.50 to 2.00
Sheet clippings	1.25 to 1.75
Flashings	2.75 to 3.25

#### CANADA

Dealer's buying prices per gross ton:	
Toronto Montreal	
Heavy melting steel	\$7.00 \$8.00
Rails, scrap	7.00 6.00
No. 1 wrought	6.00 5.00
Machine shop turnings	2.00 2.00
Boiler plate	5.00 4.50
Heavy axle turnings	2.50 2.50
Cast borings	2.00 2.00
Steel borings	2.00 2.00
Wrought pipe	2.00 2.00
Steel axles	7.00 9.00
Axles, wrought iron	7.00 11.00
No. 1 machinery cast	12.50 10.00
Stove plate	10.00 8.00
Standard car wheels	10.00 8.50
Malleable	10.00 8.00

Hoops	3.90
Bands	3.30
Cold-fin. rounds and hex.	3.32
Squares and flats	3.32
Hot-rolled annealed sheets (No. 24)	3.75
Galv. sheets (No. 24)	4.25
Hot-rolled sheets (No. 24)	4.25
Structural rivets	4.25
Small rivets	.60 per cent off
No. 9 ann'd wire, per 100 lb.	\$3.75
Com. wire nails, base per keg (10 to 49 kegs)	1.00
Larger quantities	2.00
Cement c'd nails, base 100-lb. keg.	1.00
Chain, per 100 lb.	1.00
	Net per 100
Seamless steel boiler tubes, 2-in.-4-in.	\$13.50
4-in.	\$14.00
Lap-welded steel boiler tubes, 2-in.-4-in.	\$12.50
4-in.	\$13.00

# PLANT EXPANSION AND EQUIPMENT BUYING

## ◀ NORTH ATLANTIC ▶

**American Airways, Inc.**, 122 East Forty-second Street, New York, has plans for new airport at Fort Worth, Tex., where large tract was recently acquired, to include hangars, repair and reconditioning shops, oil storage and distributing plant, administration building and other structures. Site will be developed for Southern headquarters. Cost over \$125,000 with equipment.

**Bureau of Yards and Docks**, Navy Department, Washington, asks bids (no closing date stated) for three 800-hp. boilers, cross drum, bent type, with super-heaters, turbine-driven stokers, motor-driven force draft fans, soot blowers, automatic combustion control with master controller, valves, piping, etc. (Specification 7180) for New York Navy Yard.

**Allied Brewing Corp.**, 25 Broadway, New York, recently organized, has acquired property, 125 x 535 ft., in Long Island City for new plant, with power house, pumping station, refrigerating plant, bottling works and other departments. Cost about \$1,500,000 with equipment.

**Econel Corp.**, New York, has been organized by Leo Loewy and Leon Stern, 461 Eighth Avenue, to manufacture electrical timing equipment for heaters, etc., and kindred electrical specialties.

**Superintendent of Lighthouses**, St. George, Staten Island, N. Y., asks bids until Feb. 23 for 100 acetylene cylinders, each 1060 cu. ft. capacity, for compressed gas service (Proposal 42,549); also for 84 can buoys and 78 nun buoys (Proposal 42,543).

**T. J. Ronan Co., Inc.**, 17 Atlantic Avenue, Brooklyn, manufacturer of paints, varnishes, oils, etc., has leased a five-story factory at East 135th Street and Willow Avenue, Bronx, for new plant.

**North American Brewing Co.**, Wilson and Greene Avenues, Brooklyn, will take bids soon for top story addition to plant. Bottling machinery, conveyors, tanks, etc., will be installed. Cost close to \$50,000. Allmendinger & Schindorf, 1 Hanson Place, are architects.

**Signal Supply Officer**, Army Base, Brooklyn, asks bids until Feb. 27 for 5000 reels (Circular 61), 150 radio control boxes (Circular 58); until Feb. 28, 1875 resistors (Circular 62), 150 choke coils and 100 filter choke coils (Circular 63), 150 filter capacitors, 200 by-pass and coupling capacitors, and 500 by-pass capacitors (Circular 64).

**Crutchley Engineering Co., Inc.**, Brooklyn, has been organized by Edward Crutchley, Jr., 78 Eighty-ninth Street, and associates, to manufacture heating equipment and devices.

**Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until Feb. 21 for quantity of bolts, nuts, washers, sheet piling, shapes, etc. (Schedule 9575); until Feb. 28, one motor-driven milling machine (Schedule 9615) for New York Navy Yard, insulated cable (Schedule 9617) for New York and Philadelphia Navy Yards.

**Essex County Vocational Schools**, room 321, Hall of Records, Newark, N. J., Robert O. Beebe, director, asks bids until Feb. 24 for tools and equipment for machine, sheet metal, auto mechanics, electrical, carpentry, pattern-making, aviation, radio, printing, plumbing and other departments; hand tools, steel, iron, etc.

**National Oil Products Co.**, Essex Street, Harrison, N. J., manufacturer of refined oils, greases, etc., has plans for four-story addition, 84 x 130 ft. Cost about \$150,000 with equipment. Henry D. Scudder, Jr., 9 Clinton Street, Newark, N. J., is architect and engineer.

**Yale Hook & Eye Co.**, 69 Warren Street, Newark, manufacturer of snap fasteners and other metal specialties, is running on full time schedule with employment of full working force of 80 persons.

**Department of Public Affairs**, City Hall, Newark, Jerome T. Congleton, mayor, director, asks bids until March 2 for electrical equipment for City Railway, including power lines, cables, pumps, ejectors, heaters, etc.

**Naval Aircraft Factory**, Supply Officer, Navy Yard, Philadelphia, asks bids until Feb. 20 for aluminum alloy couplings (Aero Req. 958), gasoline distillation outfit, centrifuge, flasks, balance, funnels, cylinders and other laboratory equipment (NSAF Req. 5096).

**J. G. Brill Co.**, Sixty-second Street and Woodland Avenue, Philadelphia, manufacturer

of railway cars, trucks, parts, etc., is carrying out an improvement and modernization program. Cost about \$80,000.

**Board of Education**, Yeadon, Pa., plans manual training department in new high school, for which bids are being asked on general contract until Feb. 20. Heacock & Hokanson, 1211 Chestnut Street, Philadelphia, are architects.

**Depot Quartermaster**, Marine Corps, 1100 South Broad Street, Philadelphia, asks bids until Feb. 24 for 32 platform scales (Schedule 332); until Feb. 28, snap hooks for trumpets, brass keepers, waist plates, etc. (Schedule 339).

**Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until Feb. 21 for 150 aircraft thermometers (Schedule 9578); until Feb. 28, two motor-driven milling machines (Schedule 9598 and 9599), one direct motor-driven forced-draft blower (Schedule 9543) for Philadelphia Navy Yard.

**Common Council**, City Hall, Buffalo, is considering plans submitted by Frederick K. Wing Co., Prudential Building, civil engineer, for new sewage disposal plant and system, including pumping plant to cost \$200,000 with equipment, sewage treatment works costing \$3,000,000 with machinery, pipe lines, etc. Entire project to cost about \$9,023,000.

**Earle Gear & Machine Co.**, 4707 Stenton Avenue, Philadelphia, has been awarded contract for bridge operating machinery for St. Lucie River double leaf bascule bridge, Martin County, Fla. Finished weight of material will be about 69,000 lb.

## ◀ CENTRAL DISTRICT ▶

**Pittsburgh Suburban Water Service**, 11 Meade Avenue, Pittsburgh, plans installation of 175,000-gal. capacity steel tank in Ross Township, in connection with water line extensions.

**Morganstern Electric Co., Inc.**, Pittsburgh, care of Eugene B. Strassburger, Grant Building, representative, is being organized by Ralph M. and Richard R. Morganstern to manufacture electrical control and distributing equipment and other electrical machine products.

**J. C. Avis Coal Co.**, Kleencoal, Lyburn, W. Va., is considering rebuilding tiple recently destroyed by fire. Loss about \$50,000 with equipment.

**City Controller**, City-County Building, Pittsburgh, asks bids until Feb. 20 for installing about 10,500 permanent metal roadway markers also for metal traffic signs.

**Marietta Mfg. Co.**, Point Pleasant, W. Va., has secured contract from West Kentucky Coal Co., Paducah, Ky., for 10 steel barges, each 175 ft. long, 26 ft. wide and 11 ft. deep, capacity 1000 tons, and will increase operating schedule at shipyard.

**Board of Education**, Roseville, Ohio, plans manual training department in new high school, for which bids will be asked on general contract in April. Cost about \$175,000. J. P. Schooley, Masonic Temple, Zanesville, Ohio, is architect.

**Standard Oil Co. of Ohio**, Midland Bank Building, Cleveland, has begun erection of addition to local refinery for production of asphalt emulsion. Cost close to \$100,000 with machinery.

**Apex Machine & Tool Co.**, Dayton, Ohio, has been organized by Harold F. Demann, Dayton, and associates, to manufacture tools and machinery. Company will take over Apex Machine Co., Dayton, manufacturer of tool specialties.

**Dayton Street Railway Co.**, Realty Building, Dayton, Ohio, has asked bids on general contract for one-story car barn, 90 x 130 ft., with mechanical and inspection shops. Cost over \$50,000 with equipment. Danis-Hunt Co., 1530 East First Street, is architect.

**Contracting Officer**, Material Division, Wright Field, Dayton, Ohio, asks bids until Feb. 20 for 1850 self-locking padlocks (Circular 365); until Feb. 21, 230,000 brass black enamel lacing hooks (Circular 378); until Feb. 23, buckets and scoops (Circular 374); 816 running lamp assemblies (Circular 382); until Feb. 27, one patternmaker's lathe, two surfacers, three band saws, two planers and jointers, two sanders, two cut-off saws, two scroll saws, one variety saw and one automatic saw filer, all motor-driven (Circular

362); 9000 lb. steel wool (Circular 384); until Feb. 28, 800,000 grommets (Circular 385); until March 1, 90 propeller blades (Circular 368); 200 radio shielding assemblies and 8600 spark plug shields (Circular 373); until March 6, 234 liquid oxygen vaporizer assemblies (Circular 377).

**Crosley Radio Broadcasting Studios**, 1329 Arlington Street, Cincinnati, operating Station WILW, has approved plans for new high-power radio broadcasting station, with power house, steel towers for antenna and other equipment. Cost about \$400,000 with machinery.

**E. Kahn's Sons Co.**, 3241 Spring Grove Avenue, Cincinnati, meat packer, has plans for one-story addition, 40 x 100 ft., for carcassing service, installation to include crushing, conveying and other equipment. Cost about \$35,000 with machinery. Carl J. Kiefer, Schmidt Building, is consulting engineer.

**E. W. Bliss Co.**, Brooklyn, N. Y., manufacturer of presses, dies, rolling mill machinery, etc., has resumed operations at branch plant at Salem, Ohio, following extended shut-down, reinstating a large number of employees. Production is being scheduled for next six months.

**Auto-Motive-Air Brake Co., Inc.**, Kokomo, Ind., has been organized by John M. and Albert P. Crell, Kokomo, and associates, to manufacture brakes and other mechanical equipment.

**White Star Refining Co.**, 903 West Grand Boulevard, Detroit, manufacturer of lubricating oils, greases, etc., has awarded general contract to Martin Krausmann Co., 955 East Jefferson Street, for one-story addition to refinery at Trenton, Mich. Cost over \$25,000 with equipment.

**Reinhold Mfg. Co.**, 521 St. Jean Street, Detroit, has been organized by Raymond J. Petz, 1400 Harvard Avenue, Grosse Pointe Park, and associates, to manufacture ice-cubing and ice-cutting machines, and kindred specialties.

**Flint Brewing Co., Inc.**, Flint, Mich., recently organized by James C. Flanders, 301 Citizens Bank Building, and associates, is considering erection of a brewing plant. Cost over \$100,000 with equipment.

**City Council**, Owosso, Mich., plans installation of pumping machinery and other equipment in connection with new sewage plant and water-softening station. Cost about \$150,000. Hoad, Decker, Shoecraft & Drury, Ann Arbor, Mich., are consulting engineers.

**Swift Brothers, Inc.**, Saginaw, Mich., has been organized by John Swift, 2511 Mackinaw Street, and associates, to manufacture motor trailers, parts, motor truck bodies, etc.

**Donald Laskie**, Grand Rapids, Mich., architect, is drawing plans for remodeling local building for a new brewery. Cost about \$150,000 with machinery. Program probably will be carried out by Grand Rapids Brewing Co., 303 Michigan Trust Building, recently organized by G. A. Kusterer and associates.

**Industrial Plants Corp.**, Columbus, Ohio, will sell at public auction, on Feb. 21, land, buildings and equipment of Bucher & Gibbs Plow Co., Canton, Ohio. Property to be sold also includes branches at Springfield, Mo., Green Bay, Wis., Minneapolis, Minn., Nashville, Tenn., and Los Angeles.

## ◀ SOUTH ATLANTIC ▶

**General Purchasing Officer**, Panama Canal, Washington, asks bids until Feb. 23 for car wheels, wire rope, bolts, nuts, rivets, pipe fittings, valves, cocks, electric headlights, crucible, nails, pipe covering and other equipment (Schedule 2839).

**American Locomotive Co.**, 30 Church Street, New York, is planning to use part of branch plant at Richmond, Va., for manufacture of power reverse appliances and equipment for locomotives, as recently ordered for all locomotives by Interstate Commerce Commission.

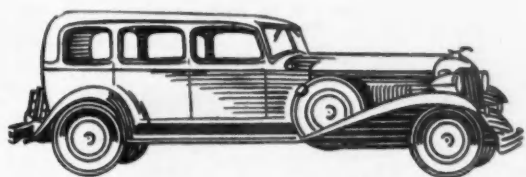
**Superintendent**, St. Elizabeth's Hospital, Washington, asks bids until Feb. 21 for one 18-in. geared engine lathe, 8-ft. bed; until Feb. 20, two air-driven presses for laundry service.

**Board of District Commissioners**, District Building, Washington, has asked bids on general contract for new Seth L. Phelps Vocation School, to be used as complete trade school



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for boys. Cost over \$350,000 with equipment. Albert L. Harris, address noted, is municipal architect.

**Allied Machine & Stamping Works, Inc.**, 211 West Perry Street, Baltimore, has been organized by Arthur Rosett and associates, to manufacture metal stampings, machine parts and kindred mechanical specialties.

**Quartermaster**, Key West Barracks, Key West, Fla., asks bids until Feb. 24 for one combination wood-working machine (Circular 5).

**Bureau of Yards and Docks**, Navy Department, Washington, asks bids (no closing date stated) for three-story addition to storage and distributing building at naval fleet air base, Pearl Harbor, T. H. (Specification 7085).

**Elliott & Myers Co.**, 315-17 Mangum Avenue, High Point, N. C., manufacturer of automatic machines and parts for cotton mill service, etc., is planning installation of additional machine shop equipment.

**Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until Feb. 21 for one motor-driven precision bench milling machine (Schedule 9610), one hardness testing machine (Schedule not noted) for Norfolk, Va., Navy Yard; 200 aircraft protractors (Schedule 9577), 500 aircraft compasses (Schedule 9576) for Washington Navy Yard; 32,000 lb. welding electrodes (Schedule 9579), one electric furnace (Schedule 9487), electric terminals (Schedule 9490) for Eastern and Western yards; 34,800 lb. brass tube sheets (Schedule 9566) for Boston, Philadelphia, Brooklyn and Puget Sound yards; until Feb. 28, 12 hoist units, six control equipments and spare parts (Schedule 9586) for Camden, N. J., and Mare Island, Cal., yards; steel tubing (Schedule 9624) for Washington yard; electric-operated valve (Schedule 9581) and two battery charging outfits (Schedule 9609) for Eastern and Western yards.

## ◀ SOUTH CENTRAL ▶

**May Trailers, Inc.**, New Orleans Bank Building, New Orleans, manufacturer of motor trailers, parts, etc., has taken over two buildings at 4120-22 South Carrollton Avenue, and will remodel into one main plant unit for parts production and assembling. New equipment will be installed. W. P. Connery is head.

**Quartermaster**, Fort McClellan, Ala., asks bids until Feb. 20 for one concrete mixer machine (Circular 12).

**United States Engineer Office**, Memphis, Tenn., asks bids until Feb. 23 for one dredging ladder (Circular 450).

**Southern Harvester Co.**, 816 Howard Street, New Orleans, manufacturer of harvesting machinery, cotton pickers and kindred equipment, has plans for an assembling plant at Lake Providence, La.

**Monarch Oil Refining Co.**, New Orleans, N. B. Duncan, head, has taken over local plant of United States Oil Refining Co., and will begin operations soon. New owner will develop plant to handle about 1000 bbl. of crude oil daily.

**American Potash & Super-Phosphate Corp.**, Canal Bank Building, New Orleans, recently organized by L. M. Turnbull and associates, capital \$250,000, is planning erection of new plant near city for production of potash, to include power house and machine shop. Cost about \$75,000 with equipment. Mr. Turnbull will be general manager.

## ◀ MIDDLE WEST ▶

**City Council**, Waverly, Iowa, R. O. Clark, city clerk, asks bids until March 1 for two Diesel engines, 750 and 475-hp. capacity, respectively, and accessories for municipal electric light and power plant.

**Omaha Casket Co.**, Omaha, Neb., plans rebuilding part of plant recently destroyed by fire. Loss over \$80,000 with equipment.

**Saver Renewable Reseat Tool Co.**, 549 West Randolph Street, Chicago, has been organized by Ewart H. Bolton and Luring V. Warner, to manufacture special tools and labor-saving equipment.

**City Council**, Cheyenne, Wyo., J. K. Stoddard, city clerk, plans installation of pumping machinery and other equipment, pipe lines, etc., in connection with extensions and improvements in waterworks. Cost over \$200,000 with equipment.

**United States Engineer Office**, Rock Island, Ill., asks bids until Feb. 24 for one steam-operated locomotive crane, 30-tons capacity (Circular 96).

**Genoa-Columbus Loup River Development Commission**, Columbus, Neb., has plans for a

hydroelectric power development in connection with a power canal project on Loup River. Cost over \$2,000,000 with transmission system. Fred Albert, Columbus, and George E. Johnson, Lincoln, Neb., are consulting engineers.

**American Smelting & Refining Co.**, New York, has resumed operations at plant at East Helena, Mont., following shut-down since last June, reinstating about 200 men.

**Superintendent of Lighthouses**, Milwaukee, asks bids until Feb. 28 for one cast iron lantern house, 8 ft. 9 in. diameter and 17 ft. high, for North Manitou Shoal Light Station, Mich.

**Kearney & Trecker Corp.**, 6784 West National Avenue, Milwaukee, has received order for 15 milling machines from Mitsubishi Shoji Kaisha, Ltd., Tokio, Japan, valued at from \$75,000 and \$80,000. Some tools will be taken out of stock but special tooling, cutters, etc., will provide work for 100 employees for at least 60 days.

**Johnsen Piston Ring Co.**, Wausau, Wis., recently incorporated with \$25,000 capital stock, has established plant and offices at 1041 Harrison Boulevard to manufacture replacement parts for automotive trade. Sigfred Johnsen, president and general manager, until recently was head of Wausau Motor Parts Co.

**George Deitte**, for 10 years associated with Schroeder Machine Co., Fond du Lac, Wis., has opened a machine shop for general jobbing work at 36 West Second Street, Fond du Lac.

**R. J. Schwab Sons Co.**, Milwaukee, has been incorporated by Henry E. Schwab and associates to manufacture heating equipment, air conditioners, filters, etc. Plant and offices have been opened at 605 South First Street.

## ◀ NEW ENGLAND ▶

**Salem Oil & Grease Co.**, 60 Grove Street, Salem, Mass., is planning one-story storage and distributing plant addition. Cost over \$25,000 with equipment. Smith & Walker, 80 Boylston Street, Boston, are architects.

**Construction Service, Veterans' Administration**, Washington, asks bids until Feb. 21 for pumping plant with deep well pumping unit and accessories at institution at New Bedford, Mass.

**Temperature, Inc.**, Boston, has been organized by David Greer, 109 Brackett Road, Newton, Mass., and associates, capital \$50,000, to manufacture temperature and heating equipment, refrigerating machinery, etc.

**Cities Service Refining Co.**, 260 Tremont Street, Boston, plans rebuilding part of oil refinery at East Braintree, Mass., recently destroyed by fire. Cost about \$50,000 with equipment.

**Union Metallic Cartridge Co.**, Bridgeport, Conn., a subsidiary of Remington Arms Co., same place, has adopted full five-day week schedule.

**Torrington Co.**, Torrington, Conn., manufacturer of swaging machinery, metal specialties, needles, etc., has acquired plant and business of New Home Needle Co., Orange, Mass., a unit of Consolidated Industries, Inc., Rockford, Ill. Orange plant will be continued at present location.

**Barstow Burner Co.**, Providence, R. I., has been organized by J. Palmer Barstow, 124 Morris Avenue, and associates, to manufacture oil burners and oil-burning equipment.

## ◀ SOUTHWEST ▶

**Crosby-Moran Co.**, Exchange Bank Building, Tulsa, Okla., operating oil properties, has plans for new gasoline refinery near Holdenville, Okla., and will remove plant at Earlsboro, Okla., to new location. Cost over \$100,000 with machinery.

**City Council**, Paragould, Ark., has engaged W. A. Fuller Co., 2916 Shenandoah Avenue, St. Louis, consulting engineer, to prepare plans for a municipal electric light and power plant, for which fund of \$100,000 has been authorized.

**Phillips Petroleum Co.**, Bartlesville, Okla., will carry out expansion and improvements at oil refinery, Kansas City, Kan., with installation of additional equipment both for crude oil supply and refining. Bulk storage and distributing facilities will also be increased.

**Normandy School District**, Normandy, Mo., Fred B. Miller, 6701 Easton Avenue, superintendent, plans installation of vocational training shops in one-story and basement addition to high school, for which bids have been

asked on general contract. Bond issue of \$225,000 has been sold for work. William R. Ittner, Continental Life Building, St. Louis, is architect and engineer.

**Common Council**, Okemah, Okla., plans installation of pumping machinery and other equipment, pipe lines, etc., for new water supply system. Cost about \$75,000. V. V. Long & Co., Colcord Building, Oklahoma City, Okla., are consulting engineers.

**Pittsburgh Plate Glass Co.**, Grant Building, Pittsburgh, has resumed operations at sheet glass manufacturing plant at Henryetta, Okla., following shut down for seven months, reinstating about 300 men.

**Turley Gear & Machine Co.**, St. Louis, has been organized by W. Havard Perkins and Gunner Gunderson to manufacture gears, machine parts, etc. New organization will take over company of same name at 1505 North Tenth Street.

**Common Council**, Eldorado Springs, Mo., has called special election to vote bonds for \$75,000 for a new municipal electric light and power plant. W. B. Rollins & Co., Railway Exchange Building, Kansas City, Mo., are consulting engineers.

**City Packing Co.**, Fostepco Heights, Fort Worth, Tex., meat packer, has taken out permit for rebuilding part of plant recently destroyed by fire. Cost about \$40,000 with equipment.

**Golden Petroleum Co.**, Ballinger, Tex., operated by M. M. McCabe, San Antonio, Tex., and associates, has selected site about seven miles from city for new oil refinery and will begin work soon. Cost over \$75,000 with equipment.

## ◀ PACIFIC COAST ▶

**Constructing Quartermaster**, Fort Mason, Cal., asks bids until Feb. 28 for steam turbine electric generating equipment for power plant at Letterman General Hospital (Circular 14).

**Board of City Trustees**, Brawley, Cal., is considering erection of a municipal electric light and power plant, using Diesel engine units. Burns-McDonnell-Smith Engineering Corp., Western Pacific Building, Los Angeles, consulting engineer, has submitted report recommending such plant at cost of \$200,000 with equipment. Brawley Municipal League is interested in project.

**Reliance Regulator Corp.**, 1000 Meridian Avenue, Alhambra, Cal., recently organized to take over Reliance Iron Works, is expanding foundry facilities and will engage in all branches of casting, instead of specializing in light castings, as heretofore. Officers of company are same as those for previous iron works, including W. M. Thompson, president, and A. C. Thompson, vice-president and general manager.

**Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until Feb. 21 for one motor-driven openback bench press and one motor-driven floor stand press (Schedule 9548); until Feb. 28, one motor-driven milling machine (Schedule 9567) for Mountain View, Cal., Navy Yard; 60 pneumatic sealing hammers (Schedule 9580), one milling machine (Schedule 9572) for Mare Island Navy Yard; one shaper (Schedule 9606) two grinders, all motor driven (Schedule 9605), for Puget Sound Yard.

**Maury I. Diggs**, 364 Fourteenth Street, Oakland, Cal., architect, has plans for two new six-story breweries at Oakland and Los Angeles, respectively, for company whose name is temporarily withheld. Cost about \$600,000 and \$700,000, in order noted, including equipment.

**Bureau of Yards and Docks**, Navy Department, Washington, asks bids until March 8 for three 500-hp. watertube boilers, oil burning units, desalinating feed water heater, boiler feed pumps, boiler accessories, piping systems, etc., for naval operating base, San Diego, Cal. (Specification 7171).

## ◀ FOREIGN ▶

**Municipal Government**, Aviation Department, Rio de Janeiro, Brazil, has approved plans for new metropolitan airport, including hangars, machine shop, pumping plant, oil storage and distributing units, administration building and other structures. Cost over \$750,000 with equipment.

**Firestone Hispania, S. A.**, Bilbao, Spain, affiliated with Firestone Tire & Rubber Co., Akron, Ohio, has begun construction of new plant for manufacture of automobile tires and tubes. Cost over \$400,000 with machinery. Company was organized a few months ago with capital of 15,000,000 pesetas (about \$1,280,000).



# Here's why Exide-Ironclads mean **ECONOMY!**

EXIDE-IRONCLAD CELL cut away to show a construction different from that of any other battery. Not made different just to be different, but possessing a construction that assures low operating costs and a long, active life of absolute dependability in every type of industrial truck service. Pencil points to the positive plate.



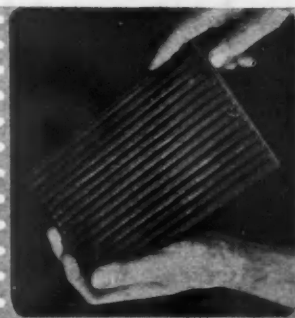
OWNERS' EXPERIENCES PROVE that this Exide-Ironclad Battery for industrial trucks saves real dollars because of its long life of trouble-free service.

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The World's Largest Manufacturers of Storage Batteries for Every Purpose

Exide Batteries of Canada, Limited, Toronto

## Exide IRONCLAD BATTERIES



ONE OF THE REASONS for the long, economical life of the Exide-Ironclad Battery—the positive plate. The plate consists of a metal grid from which extend a number of parallel metal conducting rods. Surrounding each rod is a rubber tube slotted horizontally to permit the access of the electrolyte. Within the rubber tubes and surrounding the conducting rods is the active material of the plate.



ONE OF THE SLOTTED TUBES of which the positive plate is composed. Immersed in liquid it shows how the electrolyte meets the active material within the tube, through the slots in the tube, but does not wash it away. This construction gives the Exide-Ironclad battery sustained power over an unusually long life period. Many letters in our files from users testify to this (copies on request).



THE PENCIL POINTS to the active material within the slotted rubber tube. The cut-away section also shows conducting core rod running through the center of the tube. The cylindrical construction of the tubes of the positive plate resists distortion because of the fact that expansion and contraction is equal in all directions.

# A Record-Controller for Testing

(Concluded from Page 276)

length of the specimen have no effect on the controlled rate of strain or stress application. The only possible case of failure of the control would be a slippage so great and so rapid that the quantity of fluid from the pump would not be sufficient to cause the load-producing ram of the testing machine to follow up with the requisite velocity.

In the application of a constant load over a period, a disk with an interrupted metallic strip and a cat-whisker is made to control the valve and to admit only enough fluid to the cylinder to compensate for creep (if any) and for leakage in the hydraulic load-producing system. The length of time available for load maintenance is limited only by the ability of the hydraulic pump (supplying fluid under pressure to the load-producing cylinder of the testing machine) to carry full load continuously.

It is possible, also, to produce strain-time or stress-time graphs by availing of the synchronous motor motions described in connection with the constant rate of strain and constant rate of stress devices.

The recorder-controller is applicable as described to any testing machine having hydraulic load-measuring means with an overall accuracy in the best of them equal to that of the machine without the recorder-controller. In some cases the overall accuracy will actually be better than that of the machine with its own indicating device.

The development of the Southwark-Emery recorder-controller for application to those types of testing machines having mechanical load-producing mechanisms and lever-type weighing systems has not yet been made. The application of the recorder alone is simple and easy. The motion of the poise is made to move the pencil along the ordinate while the extensometer is utilized to control the rotation of the drum in fundamentally the same manner as previously described. The application of the recorder-controller to these types is much more difficult but not impossible.

Altogether the devices are a long and important step forward in the field of materials testing. It has never before been possible, automatically, to control, within narrow limits, rates of strain and stress application and with some materials, e.g. lead and other non-ferrous materials, these rates are of vital importance in the interpretation of results of tests. These instruments offer to materials-testing engineers, in routine testing, new and valuable devices for the interpretation and control of results and, to the research engineer, precision equipment worthy of a place among the tools of the most exacting investigators.

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### "VALVES"

A cone-shaped valve was forced into a seat by a compression spring, adjustable by means of a screw. Spring pressure was relieved until leakage began. A graduation in connection with the screw or with the spring indicated pressure. cf. De Pombour, "A Practical Treatise on Locomotive Engines, etc." 1840 edition.

### EXTENSOMETER BIBLIOGRAPHY.

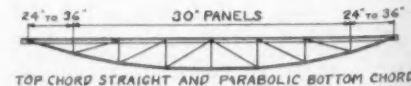
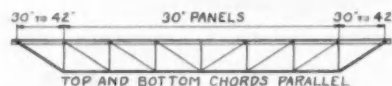
Jr. Optical Society of America, Vol. IX. No. 3, Sept., 1924.

## Shop-Made Steel Joists

Arc-welded steel joists, of a design allowing for what is substantially quantity production, have been available for some time to steel fabricators and ornamental iron workers under license from George F. Pawling, whose Pawling system was described in THE IRON AGE of Nov. 13, 1930. One of the main features of the system, which is handled by the Modern Fire-proof Construction Co., 4417 North Sixth Street, Philadelphia, is a Pratt truss in which the vertical members now are channels.

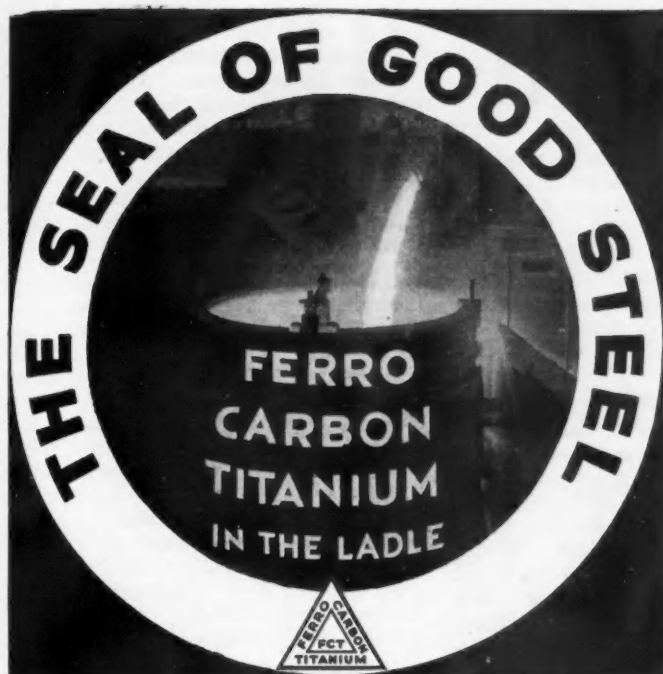
The accompanying drawings show the standard designs, which compre-

hend intermediate panels 30 in. long with end panels of varied length to secure the total desired lengths. The top chord is of tee-shaped rolled steel with a depth of 2½ in. and a width of 1½, 2¼ or 3 in. The vertical channel web members are slotted at the top to fit on both sides of the stem of the top-chord tee and are arc welded on two sides. For the bottom chord diagonals are likewise steel rods, and two steel rods are used and the whole welded into a single structural unit. On the basis of an hourly charge of 80c. for welders and 50c. for helpers, the shop labor cost for assembling and welding is put at \$8 a ton.



PAWLING standard joists for spans of 20 to 22 ft., of which the top and bottom chords and web members are delivered to a licensee's shop ready for assembling and welding.



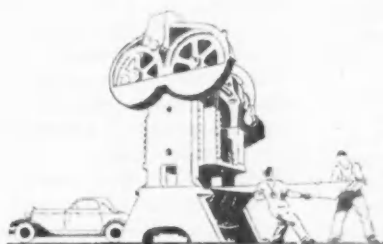


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## New Developments in Galvanizing

(Concluded from Page 273)

tration of No. 20 dip. This concentration varies with the type of material being galvanized and depth of flux desired.

As for the economy in its use—this may best be demonstrated by the fact that one of the plants chosen for the experimental runs is located in Canada and finds the economy and the resulting quality of work so evident that it continues its use in spite of the duty and rate of exchange now in effect.

### Development in Continuous Wire Galvanizing

IT will be interesting in this resumé to say something about the new continuous wire galvanizing technique, although I am not prepared at this time to give detailed statistics. The standard wire galvanizing technique, which has remained unchanged for many years, is surprisingly lacking in standardization of technique and controllable steps within the process.

In the so-called standard operation we have first a lead pan for annealing the wire involving lead cost, upkeep cost, and fuel cost and in this one step of the operation the wire must be brought from room temperature up to about 1000 deg. This lead pan produces a scaled wire and the scale must be removed by means of acid cleaning. This dissipates all the heat which has been put in the wire at the lead pan, at least to the temperature of the acid. The wire is then immersed in the zinc bath and again brought to about 850 deg. and then wiped by means of lever, screw, charcoal or bobbin wipes. The control of each one of these steps rests in the judgment of the working operators.

This technique results in many variations and success must depend upon the ability, attention and care continuously given by the operators. In an industry where various weights of coat, various degrees of ductility and where many variations as to metallurgy abound, it is not desirable to depend entirely upon the efficiency of the personnel.

The writer has slept with this situation so long that it was only natural that dreams of many changes should ensue. The result was the demonstration of the continuous galvanizing technique given to many of my friends in the wire industry in Toledo last spring and the first commercial installation which is now in operation.

#### Lead Pan Eliminated

To outline this new technique briefly: We eliminated entirely and forever the lead pan with all its disagreeable features and expense. The

wire is brought to the galvanizing plant from the draw benches and the slight amount of cleaning necessary is effected, ultimately I hope, with an abrasive, and put through a bright annealing furnace in tubes containing a deoxidizing atmosphere. After passing through this furnace and being therein properly annealed, it is presented immediately to a small galvanizing unit and wiped—that is all.

Ultimately a series of specifications for each grade of coat and metallurgy of wire, giving merely the temperature of the bright annealing furnace, the temperature of the kettle and the speed of the wire, will result in a perfectly uniform wire and uniform production covering each specification. And each of these specifications is controlled automatically and not by the personnel in charge. The only step in this operation as it is now set up which depends upon the judgment of the operator is the wipe and this is now being taken up in the laboratory.

It will be realized that this technique eliminates all of the lead and lead pan expense; it eliminates all that portion of the galvanizing kettle which, in the old technique, is used solely to bring the wire from acid temperature to 850 deg.; it eliminates completely the lead pan fuel consumption as heat is applied to the wire only once in the bright annealing furnace. It will increase the life of the galvanizing kettle because of the elimination of the heat input at that source and by the same token will decrease the residuum losses. All in all, a saving over old technique of over \$1 per ton is looked for.

### Diffusion Flame for Heating Galvanizing Kettles

NOW in speaking of new developments in galvanizing, it is necessary to refer to the application of diffusion flame in heating galvanizing kettles. In this instance, the writer had nothing to do with this development except as to its application to galvanizing.

In diffusion flame combustion, the process which has been the object of extensive research, gas is made to burn with an intensely luminous flame, highly radiant within itself, and probably more responsive to control than any other fuel. The term is derived from and applied to those gas flames in which the air for combustion reaches the gas by diffusion through the flame proper, and not through any form of pre-mixing. The flame proper thus becomes an intense source of radiant energy, whose luminosity results from the heating to incandescence by combustion of the surrounding gases, of the free carbon derived

from the decomposed hydrocarbons. High emissivity factors are obtainable through efficient design of diffusion flame burners. As a practical result, a relatively low temperature head will enable a large portion of available furnace heat to reach and penetrate a wall of inert, non-combustible gases sometimes used to protect work from direct-flame impingement.

The application of diffusion flame to deep-fired galvanizing equipment has met recently with signal success because of the possibility, with this method of heating, of avoiding all question of flame impingement. This flame, operating length-wise of the kettle, has many advantages over the impact burner type. A number of these installations have been made and the advantages of this method of firing have resulted very favorably in regard to both fuel consumption and pot deterioration. However, as in the impact burner method, experience reveals the necessity of carefully designing the setting in each different type of procedure. In other words, there are very definite reasons for varying the source of heat input for each standard technique. Where these reasons are understood and followed out the diffusion flame offers an improvement in the heating of galvanizing kettles.

### Three Developments Now Under Way

NOW, in this discussion so far, I have dealt entirely with those improvements which had been effected. There is much to be done and my laboratories are now undertaking three definite steps, each of which are well along toward solution.

In the first instance we are endeavoring to perfect an automatic wipe for galvanizing wire which, when perfected and in conjunction with the continuous galvanizing process, will relieve this process of the necessity, now existent, of depending upon the ability and judgment of operators at this point in the process.

Second, we are in the midst of a very interesting development which holds excellent prospects of offering to the field a zinc container which will be entirely permanent and not subject to deterioration.

Third, some very interesting work is in development having for its objective a bright and brilliant coat on galvanized work.

In the last analysis this old tried and true method of protecting iron from corrosion is receiving attention from progressive manufacturers. You know it is the disposition of a human animal to do tonight at a given hour the thing which it did last night at the same hour, and this has been particularly true in the past with galvanizing. To those firms and men who have striven for the improvement of galvanizing, as I said before, great credit is due.